Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Bryan D. Nordlund

On Behalf Of:

U.S. Dept. of Commerce, National
Oceanic & Atmospheric Admin.

Author ID Number:

316bNFR.001

Comment ID 316bNFR.001.001

Subject Matter Code	10.021
Request for Comment: Intake Velocity Limitation	

Author Name Bryan D. Nordlund

Organization U.S. Dept. of Commerce, National Oceanic & Atmospheric Admin.

The Northwest Region of the National Marine Fisheries Service (NMFS) is responsible for the protection of all anadromous fishes in Washington, Oregon and Idaho, including several species listed as candidate, threatened or endangered under the Endangered Species Act (ESA). Over the course of the last several decades, we have developed comprehensive intake screen criteria designed for the protection of juvenile salmonids at a variety of types of water intakes. Our criteria is based on a successful, workable integration of biological studies, hydraulic observation and design, operations and maintenance experience, hydraulic modeling and experience derived from design and testing of thousand's of intake screens in the Pacific Northwest. These are the standards used in the Northwest for intake screens and are among the basic requirements for a no-jeopardy Biological Opinion under the ESA for a water intake project, as well as the basis for any water intake to receive a take limit under the 4(d) rules for ESA-listed fish. As such, it is imperative that any criteria established by the Environmental Protection Agency be entirely consistent with those of the NMFS, especially for those waters with species listed under the ESA. We recommend that the intake screen criteria in your proposed rule be replaced with the attached document specifying NMFS intake screen criteria, at least for those waters containing anadromous fish in Oregon, Washington and Idaho.

EPA Response

EPA's final regulation prohibits Track I facilities from exceeding a 0.5 ft/s through screen velocity. EPA determined that, so long as velocity did not exceed this level, impingement of fish and other aquatic biota at most life stages would be prevented. In developing the intake velocity requirement, EPA assumed a flat screen with the intake flow directly perpendicular to the face of the screen, because this is a typical arrangement for a cooling water intake structure. However, angled screens, such as those described in the NMFS requirements, are used in some intake designs, and EPA does not wish to discourage any intake designs. Under § 125.86, the Director may require additional controls (such as the NMFS requirements) to complement the protection afforded by the velocity requirement. Additionally, the Director may require controls on the direction of flow (both vertically and horizontally) should the situation merit such controls. EPA also expects that applicants will propose appropriate technologies and avoid well-known design flaws such as uncapped intakes with significant vertical flows.

EPA also developed the velocity requirement with a highly protective intake velocity in mind, regardless of the intake configuration. As a result, EPA's requirements may be more stringent, in particular circumstances, than existing requirements required by NMFS or other agencies. EPA also notes that, when issuing NPDES permits, the permit directors will need to comply with applicable national Marine Fisheries Service of the U.S. Fish and Wildlife Service. States may also chose to impose additional requirements, including those associated with, for example, NMFS intake screen criteria where the State determines it would be appropriate and the State is authorized to do so by State law.

Response to Public Comment

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(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Larry D. McKinney

On Behalf Of:

Texas Parks & Wildlife Dept.

Author ID Number:

316bNFR.002

Comment ID 316bNFR.002.001

Subject Matter Code SUP

General Statement of Support

Author Name Larry D. McKinney

Organization Texas Parks & Wildlife Dept.

We support this attempt by the U.S. Environmental Protection Agency to address the impacts to aquatic life of CWIS. We have documented numerous instances of significant mortality of aquatic organisms in Texas due to cooling water intakes. We feel that this mortality could have been prevented or minimized if cooling water intakes had been located and designed to avoid impacts.

EPA Response

EPA agrees that the final rule will prevent numerous instances of significant mortality of aquatic organisms at new facilities.

Comment ID 316bNFR.002.002

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Larry D. McKinney

Organization Texas Parks & Wildlife Dept.

We appreciate the opportunity to have input into which facilities will be covered by the rule. We support the proposed 2 million gallons per day (MGD) intake flow threshold over which facilities fall under this rule. The literature indicates that mortality due to impingement and entrainment increase dramatically above this threshold.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.002.003

Author Name Larry D. McKinney

Organization Texas Parks & Wildlife Dept.

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

We also support the 25% threshold for percentage of intake water used for cooling purposes. This is a conservative definition to ensure that facilities that are more likely to cause impacts are covered by the rule.

EPA Response

No response necessary.

Comment ID 316bNFR.002.005

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Larry D. McKinney

Organization Texas Parks & Wildlife Dept.

We support instituting restoration measures to compensate for the impact of CWIS on aquatic life. This acknowledges that it is impossible for a CWIS project to totally avoid impact to the aquatic community. However, we feel that it is important that environmental impacts be avoided and minimized as much as possible before restoration measures are considered. To facilitate this, we encourage the development of a consistent approach to applying restoration measures.

EPA Response

Today's final rule allows for the consideration of restoration measures under certain circumstances as part of a Track II new facility evaluation. Today's rule provides consistency in that it allows a process in which restoration measures may be considered. However, due to the site specific nature of restoration measures, complete and absolute consistency is not possible See sections V.B.2.f and VI.L for further discussions on restoration measures in today's rule.

Comment ID 316bNFR.002.006

Subject Matter Code 15.12

Request for Comment: Restoration Plan Development and Implementation

Author Name Larry D. McKinney

Organization Texas Parks & Wildlife Dept.

With respect to the submission of restoration plans, we support the proposal that natural resource agencies, such as TPWD, have an opportunity to review and comment on the restoration plans.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Paul D. Savoy

On Behalf Of:

Self

Author ID Number:

316bNFR.003

Comment ID 316bNFR.003.001

Author Name Paul D. Savoy

Organization Self

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

The proposed two MGD flow threshold is unrealistically small for large rivers. For example, this threshold is less than 0.01% of the Mississippi River's flow through Louisiana. In this situation, the intake flow could be increased by 5000% with no controls on the intake and 99% of the aquatic community would still be unaffected. It is difficult to understand how taking such a small fraction of the total volume would result in significant damage to the river's ecosystem. The flow threshold should be based on the level of impact. The proposed alternate threshold (25 MGD provided the facility uses less than 1% (or less than 0.1%) of a water body) is realistic.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities who could technically achieve and economically afford the requirements of the rule would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly.

Comment ID 316bNFR.003.002

Author Name Paul D. Savoy

Organization Self

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Although dry cooling systems may be a slightly more expensive option available for condensing vapors, dry cooling systems are not technically feasible when process fluids must be cooled to temperatures approaching the ambient temperature.

EPA Response

EPA agrees with the commenter. See section V.C-4 of the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
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(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Alan Spackman

On Behalf Of:

International Association of Drilling Contractors

Author ID Number:

316bNFR.004

Comment ID 316bNFR.004.001

Author Name	Alan Spackman
Organization	International Association of Drilling Contractors

Subject Matter Code MISC

Miscellaneous Comment

The International Association of Drilling Contractors is a trade association representing the interests of the owners and operators of oil, gas, and geothermal well drilling equipment, worldwide. Our membership includes all companies currently operating mobile offshore drilling units (MODUs) in areas subject to the jurisdiction of the United States. We are interested in this proposed rule since it appears that it will affect this equipment.

MODUs are specialized vessels used for drilling and servicing offshore oil and gas wells. Most vessel discharges are excluded from the NPDES by 40 CFR 122.3(a). However, this exclusion does not apply to discharges from MODUs while engaged in oil and gas exploration or development activities. MODUs move from location to location to drill both exploratory and production wells.

Particularly problematic in regard to this proposed rule is the fact that, depending on the particular circumstances, a proposed well may be covered under an NPDES permit issued to either an "existing source" or a "new source." It appears that the potential impact on MODUs and their operations were not considered in the development of the proposed rule.

Further, we are mindful that EPA is currently considering a petition for rulemaking that asks for repeal of all or part of the vessel exemption in 40 CFR 122.3(a) ("Cruise ships; management of wastewater, solid and hazardous waste, and other discharges; public information hearings;" 65 FR 49239).

On MODUs, as on almost all other vessels, seawater is used, via heat exchangers, for cooling of propulsion engines, auxiliary engines (e.g., diesel-electric generators), and desalinators. Seawater cooling may also be used for certain industrial equipment, such as the disk brake units on weight handling equipment.

Over the past five years the total number of MODUs operating at one time in areas under U.S. jurisdiction has ranged from less than 100, to more than 200. While this may be considered a large number of vessels, it is small in comparison to the total number of vessels operating in U.S. coastal and inland waters at any given time. There are five main types of MODUs operating in areas under U.S. jurisdiction: Drillships, semi-submersibles, jack-ups, submersibles and drilling barges.

Drillships. While underway between operating locations (and hence excluded from NPDES coverage) a drillship, such as the one pictured here, may have a total seawater uptake of between 16 and 20 million gallons per day (MGD), the majority of which is used for cooling the diesel-electric generators that provide both propulsive and auxiliary power. As the cooling water systems are typically redundant, the "design" uptake would be roughly double this amount. As is typical of ship construction, the seawater inlets (seachests) are located on the bottom of the ship's hull. For assurance of power, systems may be redundant, with similar installations on both the port and starboard side of the ship, or forewarned and aft, serving different engine rooms. While the depth of the seachests varies both with the loading of the ship and from design to design, most would be at a depth of 20 to 35 feet. As typical

of ship construction, screens or weirs having a maximum opening of about 1 inch protect the seachests. Some ships have chlorination systems installed to reduce marine growth within the seachests.

While engaged in drilling operations most drillships maintain their position over the well by means of "dynamic positioning" thrusters which counter the effects of wind and current. Additional power is required to operate the drilling and associated industrial machinery, which is most often powered electrically from the same diesel generators that supply propulsion power. While the equipment powered by the ship's electrical generating system changes, the total power requirements are similar to those while underway. Thus, during drilling operations the total seawater uptake on a drillship is approximately the same as while underway.

These ships operate almost exclusively in the deeper waters (> 1000 feet) of the Outer Continental Shelf (OCS). There are currently seven drillships operating on the U.S. OCS, all are in water depths of more than 5,500 feet.

Semi-submersibles. The majority of semi-submersibles are not self- propelled, and thus require the assistance of towing vessels to move from location to location. About one-third of these ships are equipped with thrusters for dynamic positioning, which increases the amount of power they require. Because of the height of the machinery above the sea surface, some of these MODUs air-cool some of their machinery using radiators rather than using seawater heat exchangers. Thus, there is wide variance in the cooling water uptake requirements for this type of unit ranging from less than 2 MGD to above 15 MGD. When on location, the seachests would typically be 45-70 feet below the sea surface.

These units typically operate in deep water (>400 feet). There are currently about 40 such units operating on the U.S. OCS at water depths ranging from 320 feet to over 7,700 feet. These units also occasionally operate in State waters.

Jack-ups. The jack-up is the most numerous type of MODU, with nearly 150 being marketed for use in U.S. waters. These vessels are rarely self- propelled and must be towed from location to location. Once on location, their legs are lowered to the seabed, and the hull is raised (jacked-up) above the sea surface to an elevation that prevents wave impingement with the hull.

Although all of these ships do use seawater cooling for some purposes (e.g., desalinators), as with the semi-submersibles a few use air-cooled diesel-electric generators because of the height of the machinery above the sea surface. Seawater is drawn from deep-well or submersible pumps that are lowered far enough below the sea surface to assure that suction is not lost through wave action. Total seawater uptake of these ships varies considerably and ranges from less than 2 MGD to more than 10 MGD.

Jack-ups are limited to operating in water depths of less than 500 feet, and may rarely operate in water depths of less than 20 feet. There are currently 138 jack-ups operating in the Gulf of Mexico at water depths ranging from 12 feet to 375 feet.

Submersibles. There are currently less than 10 submersible units being marketed for operation in areas

under U.S. jurisdiction. They are not self-propelled. Most are powered by air-cooled diesel-electric generators, but require seawater uptake for cooling of other equipment, desalinators, and for other purposes. Total seawater uptake varies considerably and ranges from less than 2 MGD to more than 10 MGD, with most below 2 MGD.

As these units rest on the seabed when operating, these units operate exclusively in shallow waters (<85 feet). The one unit currently employed is operating in an area with a 17 foot water depth.

Drilling Barges. There are approximately 50 drilling barges available for operation in areas under U.S. jurisdiction, although the number currently in operation is less than 20. These ships operate in shallow bays and inlets along the Gulf Coast, and occasionally in shallow offshore areas. Many are powered by air-cooled diesel-electric generators. While they have some water uptake for sanitary and some cooling purposes, water uptake is generally below 2 MGD.

The use of seawater cooling for these MODUs is virtually indistinguishable from the practices of other vessels employed in similar environments. MODUs differ mainly in that, when engaged in drilling operations, the majority of the power generated is used to power drilling rather than propulsion.

The proposed flow rate controls are problematic. Typical marine engineering practice is to maintain relatively high flow rates through the seachest(s) and piping in order to reduce both seachest and piping size. Velocities above 2 feet per second are not uncommon. The proposed flow rate reduction would require the fitting (or retrofitting) of considerably require larger seachests and piping. We do not consider this to be reasonable even for new construction. Fitting of larger seachests and piping to existing MODUs would not be feasible as it would virtually necessitate redesigning of the entire engine spaces -under the proposed rule it would seem such action would be required if the MODU were to be employed to drill or service a well considered to be a "new source."

In addition, reducing the flow rate in the seachests and piping would produce an ideal environment to encourage growth of marine organisms. These would need to be controlled either chemical treatment or periodic manual cleaning by divers, or both.

Given the present structure of NPDES permits for the oil and gas industries, the application of the proposed rule to "new sources" would be particularly disruptive to the marketing of MODUs, as only MODUs having seawater uptakes conforming to the requirements of the rule would be permitted to drill or service wells on "new sources." Operations on these "new sources" by all existing drillships, and most existing semi-submersibles and jack-ups would be precluded. This would greatly diminish, if not entirely eliminate for some period of time, the availability of MODUs to drill development wells from the OCS locations that increasingly becoming the mainstay of the nation's domestic oil and gas supply.

We have examined the Technical Development Document (TDD) for the development of national discharge standards for vessels of the Armed Forces (EPA 821-R-99-001, April 1999). We note that many U.S. Armed Forces vessels having power plants similar in size to those of MODUs also have cooling water discharge rates similar to those of MODUs. In our review of this document, we found no indication that mortality or injury to aquatic organisms during uptake of cooling water was even identified as a possible matter of concern, even though some of these vessels have discharge, and

presumably uptake, rates many time those of MODUs.

While IADC does not represent the seafood processing industry, as the vessels operated in support of this industry are also subject to NPDES permits, we would expect that certain of these vessels might also be affected by the proposed regulations as their power requirements would dictate cooling water uptake in excess of 2 MGD.

Notwithstanding the provisions of 40 CFR 122.3(a), IADC believes that ALL vessels, should be categorically excluded from the provisions of this rule. However, if EPA believes that controls over water uptake by vessels engaged in oil and gas exploration and development activities MAY be warranted, we would suggest that the rule be structured so as to allow them to be specified by the Director under the proposed §125.84(f) and (g). They could then be included, as appropriate, in the NPDES permits governing offshore oil and gas activities.

EPA Response

Please see responses to comments 316bNFR.022.002 (offshore and coastal oil and gas facilities to be addressed in Phase III 316(b) rule), 316bNFR.022.005 (retro-fits of existing facilities), 316bNFR.022.007 (current lack of demonstrated relationship between intake velocity and marine growth).

The Technical Development Document (TDD) for the development of Uniform National Discharge Standards (UNDS) for vessels of the Armed Forces (EPA 821-R-99-001, April 1999) describes the nature of discharges from seawater piping biofouling prevention systems and seawater cooling systems along with other discharges. UNDS applies to discharges incidental to the normal operation of Armed Forces vessels. Therefore, only effects caused by incidental vessel discharges were considered - not impacts caused by vessel intake structures. EPA also notes that one purpose of the phase I UNDS rule was to determine which incidental discharges require control with a marine pollution control device (MPCD). The phase I UNDS rule did not examine all potential impacts from seawater cooling and seawater piping biofouling prevention discharges because EPA and Department of Defense (DoD) determined there were enough data to support the decision to require control of these discharges. Therefore, EPA disagrees with the commenter that a lack of discussion in the UNDS TDD means that EPA concluded that there are no potential impacts from vessel CWIS. EPA will examine potential impacts from offshore and coastal oil and gas facilities in the Phase III 316(b) rule.

EPA thanks the commenter for identifying the seafood industry as a potentially affected industry. EPA plans to examine all potential options for this industry in the Phase III 316(b) rule.

EPA will examine all options for the offshore and coastal oil and gas extraction industry for the Phase III 316(b) rule. This includes including controlling offshore and coastal oil and gas CWIS via NPDES permits.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
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(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jim Gormanson

On Behalf Of:

Noble Drilling Services Inc.

Author ID Number:

316bNFR.005

Note

Fully supports the comments made by IADC (316bNFR.004)

Comment ID 316bNFR.005.001

Subject Matter Code MISC

Miscellaneous Comment

Author Name Jim Gormanson

Organization Noble Drilling Services Inc.

Noble Drilling Corporation and its subsidiaries own and operate 49 Mobile Offshore Drilling Units world-wide, with 20 MODUs operating in the U.S. Gulf of Mexico. Of these vessels in the Gulf of Mexico, five are semi-submersibles capable moored operation in 6000 to 6600 feet of water, three submersibles capable of bottom bearing operation in up to 55 feet of water, and 12 self-elevating units capable of 250 to 390 feet of water. All of these vessels are non-self propelled (all must be towed from one location to the next).

The EPA is proposing to modify the regulations governing cooling water intakes for new facilities by restricting cooling water intake velocities less than 0.5 feet/sec for withdrawal rates in excess of 2 million gallons per day (MGD). Since MODUs come under the NPEDS permits while on location conducting exploration and exploitation activities, this restriction greatly concerns us.

MODUs by virtual of their construction are vessels subject to various international standards, flag state and classification society rules and regulations, and domestic regulations by the U.S. Coast Guard, Minerals Management Service and EPA. The vast majority of these vessels use salt water cooling of their engines, while some have limited cooling water intake for auxiliary equipment such as heavy lifting equipment and desalinators. Semi-submersibles, submersible and self-elevating MODUs are normally equipped with sea chests in the hull of the vessels for withdrawal of seawater for cooling water and other systems. The rate of withdrawal through the sea chests range from 2.5 to 7.2 MGD. When on location and elevated, the self-elevating MODUs take their cooling water from a raw water tower that is lowered from the hull platform to below the surface of the ocean. The raw water tower is normally equipped with two to three deepwell pumps capable of 4 MGD to 7.8 MGD.

The limitation of 0.5 ft/sec intake velocity presents significant problems to MODU cooling water intakes and hull design. For example, a typical sea chest is sized for 7000 gpm at 4.5 ft/sec will have a clear inlet of 3.5 ft2. To reduce the inlet velocity to 0.5 ft/sec, the inlet must be 31.22 ft2.

This is nearly 10 times as large as normal marine construction causing potential problems with the hull design, load paths, fatigue, etc. There is no alternative for the self-elevating MODU in the jacked up condition. The raw water tower must be of rigid construction in order to withstand the environmental conditions of the unit while elevated without compromising the functionality of the unit.

Reducing the velocity in the sea chests will promote marine growth, and require higher maintenance costs associated with removal of marine growth or chemically treating the inlet water.

Not withstanding the provisions 40 CFR 122.3(a), Noble believes that all vessels should be categorically excluded for the provisions of this rule.

EPA Response

See response to comment 316bNFR.022.002 for how EPA will handle this industry in Phase III of the 316(b) rule. See response to comment 316bNFR.022.007 for the discussion on marine growth and intake velocity.

EPA discussed this comment with the USCG and concluded that a re-designed sea-chest with a bell intake set back approximately four feet or a bell or funnel shaped cone on the end of a jack-up CWI pipe would not cause the problems identified by Noble Drilling. The USCG also stated that using the same pipe diameter (e.g., 4 to 6 feet) from the CWI structure to the top of the jack-up rig would however be a major undertaking and may cause additional concerns similar to the ones identified by Noble Drilling. EPA is only concerned about the intake velocity (and not subsequent velocities of the cooling water in the cooling water system) and is only regulating intake velocities. Therefore, using the same pipe diameter (e.g., 4 to 6 feet) from the CWI structure to the top of the jack-up rig would not be required under any potential Phase III 316(b) rule option.

Response to Public Comment

---National Pollutant Discharge Elimination System---
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(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Vernon B. Lang

On Behalf Of:

U.S. Fish & Wildlife Service

Author ID Number:

316bNFR.006

Comment ID 316bNFR.006.001

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

In general, the proposals for best technology available (BTA), environmental requirements and other aspects of the framework described in Exhibit 1 of the preamble for administering section 316(b) do not adequately reflect the environmental landscape or the recent trends in steam electric power plant development in this geographic area. This divergence from the framework has been brought about in the recent past by the adoption of dry cooling technology at many new steam electric generating facilities which eliminates the need for a cooling water intake structure and attendant impacts to waters and aquatic life. What makes the technological advance more remarkable is that in many cases, the adoption of dry cooling has been a voluntary action on the part of the applicant not the result of direct regulatory action. These actions are partly attributed to market deregulation factors whereby power plants are frequently being constructed and operated by power generators as opposed to traditional utilities. That these developments are occurring in a traditionally water rich part of the United States lends an added measure of confidence concerning the practicability of dry cooling technology. These specific comments follow the format in the preamble and draft rule.

EPA Response

EPA rejects dry cooling as best technology available for a national requirement because the technology of dry cooling carries costs that are sufficient to pose a barrier to entry to the marketplace for some projected new facilities. Dry cooling technology also has some detrimental effect on electricity production by reducing energy efficiency of steam turbines and is not technically feasible for all manufacturing applications. Finally, dry cooling technology may pose unfair competitive disadvantages by region and climate. Further, the two-track option selected is extremely effective at reducing impingement and entrainment, and while the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so at a cost that is more than three times the cost of wet cooling. Therefore, EPA does not find it to represent the “best technology available” for minimizing adverse environmental impact. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word “minimize” in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). An application of dry cooling will virtually eliminate use of cooling water and impingement and entrainment, in almost all foreseeable circumstances, would reduce a facility’s use of cooling water below the levels that make a facility subject to these national minimum requirements.

Comment ID 316bNFR.006.002

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Flow threshold in Waters of the U.S.

In this section of the preamble and in section 125.81 of the proposed rule, a flow threshold of two million gallons per day (MGD) would be established below which these cooling water intake rules would not apply. This is a matter of considerable concern in the northeast where we have experienced a surge of proposed natural gas fired generating stations on river systems that would likely be considered small when viewed on a national scale. A 2 MGD withdrawal is a large withdrawal when viewed in the context of the regulatory climate, population base, and hydrologic setting of the northeast. For example, the reporting threshold for water withdrawals in New Hampshire is 20,000 GPD or .02 MGD. In Massachusetts, the regulatory threshold under the Water Management Act is 100,000 GPD or 0.10 MGD. In the Vermont water quality standards, the regulatory threshold for water withdrawls is five percent of 7Q10 on a cumulative or aggregate basis. These regulatory thresholds for water withdrawals are a full order of magnitude or more below the threshold proposed in the draft rule. In the case of New Hampshire and Vermont, the thresholds are generally set at levels that allow for reasonable water use by riparian and littoral property owners, but below levels that would likely involve Public Trust issues. The statutory language in section 316(b) does not mandate a particular flow threshold nor does it appear to constrain the EPA's discretionary authority to capture all cooling water intake systems that withdraw cooling water from waters of the U.S., if the agency so chose. Consequently, the flow threshold should be set no higher than 0.10 MGD and preferably lower to help ensure greater consistency with regional hydrology, riparian, environmental, and regulatory thresholds if the proposed framework is retained.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

The final new facility rule does not exclude facilities withdrawing less than two MGD. Rather, EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under the rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using

BPJ.

For further discussion of these points, see Sections VI.A.3 of the rule.

Comment ID 316bNFR.006.003

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Defining Adverse Environmental Impacts

The third alternative discussed in this section of the preamble best describes the meaning of adverse impact within the context of section 316(b) and these rules. Webster's Third New International Dictionary defines adverse as follows: Adverse describes what is unfavorable, harmful, difficult or detrimental. Preceding parts in section VII. of the preamble adequately demonstrate how aquatic life are harmed by entrainment and impingement impacts when cooling water intake structures are withdrawing water for cooling and related purposes. The EPA presented considerable discussion in this section of the preamble about the relationship between various flow thresholds and the magnitude of the entrainment effect. However, the discussion seemed to be somewhat misdirected since adverse effects to aquatic life will occur well below the 2MGD flow threshold proposed in section 125.81 of this rule. Even at the 0.10 MGD flow threshold advocated in these comments, adverse effects would still occur albeit at a lower level than the proposed 2 MGD threshold. These adverse impacts to waters and aquatic life would be reoccurring and nontrivial on an individual and cumulative basis.

EPA Response

Please see response to comment 316bNFR.029.013 for EPA's interpretation of AEI under today's rule.

Those facilities that do not meet the withdrawal threshold requirements for cooling water purposes described under today's rule must meet requirements determined on a case-by-case, best professional judgment basis. (Please see 125.80(c) of today's rule.)

Comment ID 316bNFR.006.004

Subject Matter Code 125.83.14

Definition: Littoral Zone

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

The definition of littoral zone in the preamble page FR 49083 and draft rule page FR 49116 is drawn into question by the discussion of littoral zone for rivers, and lakes and reservoirs on page FR 49084. Here, the interpretation of littoral zone is different from what is implied in the stated definition and is likely to create considerable confusion. As defined on page FR 49084 for freshwater rivers, the littoral zone is the area along the shoreline that serves as the principle spawning and nursery area for many, but not all species of freshwater fish. This is considerably different from the stated definition. In contrast, the interpretation of littoral zone for lakes and reservoirs is the portion of the body of water extending from the shoreline lakeward to the deepest point at which submerged aquatic vegetation can be sustained. It appears that EPA intended for the definition of littoral zone to have separate and distinct meanings for the different categories of waters. If so, separate definitions should be set forth in the final rule if the proposed framework is retained. Under the existing definition, one could interpret the outer edge of the littoral zone in rivers to be the deepest point where submerged vegetation, e.g., algae, is sustained, not simply the area along the shoreline.

Perhaps EPA should also consider whether submerged aquatic vegetation needs to be defined since an argument could ensue as to whether it includes both non-rooted (algae) and rooted plants.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define the best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.006.005

Subject Matter Code 10.01

Regulatory Framework Options

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Exhibit 1 on page FR 49077 displays the proposed framework for administering best technology available to minimize adverse environmental impacts at cooling water intake structures. The framework would accomplish this by first grouping water bodies into four major categories and then applying location, flow (capacity), technology, and velocity standards and other unspecified requirements within each category to achieve BTA. As a consequence of this framework, different levels of protection exist based on waterbody category and location of the CWIS within the waterbody. While the framework has its advantages, it appears that the disadvantages outweigh them by some margin.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent reduction in impingement and entrainment by using alternative technologies or approaches.

While EPA continues to believe that it could have established different requirements based on general information about the productivity of water bodies, EPA decided for the new facility rule that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

EPA did not vary the performance requirements based on waterbody type because it found problems in defining and implementing a littoral zone approach and found that reducing impingement and entrainment on fresh water bodies to the same level as in estuaries and oceans to be technically feasible and economically practicable. EPA believes that this approach affords the same level of protection to all waterbodies.

Comment ID 316bNFR.006.006

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

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The third alternative provides a clear cut, simple and, precise definition of adverse impact. The definition fits well with the plain meaning of the language in this section of the CWA and appears to be well within EPA's discretionary authority. This definition also has the best fit with rules protecting threatened and endangered species and with section 9 of the Endangered Species Act regarding prohibitions on take of listed species. Accordingly, and because of the great importance of the meaning of the phase "adverse environmental impact" in this set of rules, the third alternative definition of adverse impact should be adopted in section 125.83 of the final rule. A clear cut, simple and precise definition as proposed here would help to streamline and simplify administration of section 316(b).

EPA Response

Please see response to comment 316bNFR.029.013 and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.006.007

Author Name Vernon B. Lang

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The principle and most stringent technology selected to represent BTA in the proposed framework, a closed-cycle recirculating system, does not represent BTA in the New England region. Over the last decade, dry cooling systems have emerged as the best technology to minimize impingement and entrainment impacts by avoiding cooling water use at steam electric generating stations. These projects listed below in Table 1 range in size from 24 MW to 1500 MW demonstrating the economic viability, efficiency, practicability and versatility of dry cooling technology.

Table 1 Steam Electric Stations currently operating, under construction or recently approved for construction using dry cooling in New England

Killingly, CT.	780 M.W. Dry Cooling
Oxford, CT.	512 M.W. Dry Cooling
Wallingford, CT.	250 M.W. Dry Cooling
Dighton, MA.	170 M.W. Dry Cooling
ANP Blackstone, MA.	580 M.W. Dry Cooling
ANP Bellingham, MA.	580 M.W. Dry Cooling
Sithe Mystic, MA.	1500 M.W. Dry Cooling
Cabot Island End, MA.	350 M.W. Dry Cooling
Sithe Fore River, MA.	750 M.W. Dry Cooling
IDC Bellingham, MA.	525 M.W. Dry Cooling
Medway Station, MA.	275 M.W. Dry Cooling
Wheelabrator-Sherman, ME.	24 M.W. Dry Cooling
Rumford, ME.	265 M.W. Dry Cooling
Tiverton, R.I.	265 M.W. Dry Cooling
Indeck, R.I.	350 M.W. Dry Cooling

Dry cooling technology frees the industry user groups from unnecessarily restrictive requirements to site facilities adjacent to or short distances from waterbodies or other sources of cooling water. This freedom from water dependency needs to be recognized and duly accounted for in the final rulemaking since it has major regulatory implications in section 404 of the CWA and would seemingly have similar technology and regulatory implications under sections 306 and 402. The demonstrations by the 15 facilities in Table 1 that dry cooling represents BTA is a sufficient and compelling reason for EPA to revise the proposed framework in Exhibit 1 and Section 125.84 on a regional, if not national scale.

EPA Response

EPA disagrees with the commenter and concludes that dry cooling does not represent best technology available for minimizing impingement and entrainment for any climactic region for a nationally

applicable rule. While EPA agrees that dry cooling has been demonstrated in northern US climates, such as the New England region, EPA's record shows that a dry cooling based option would pose barriers to entry for some new plants (see the Economic Analysis for the final rule). As such, regional subcategorization options would pose similar barriers to entry for new plants in New England, combined with imposing competitive disadvantages for the subset of facilities complying with more stringent and costly standards than the other regions of the country. In addition, EPA's record demonstrates that of the demonstrated, permitted, or planned power plants in the Northeast United States with dry cooling, the size and capacity of the dry cooling system is considerably smaller than that necessary to condense the steam load even for below average sized coal-fired power plants projected within the scope of this rule (see responses to comments 316bNFR.053.010 and 316bNFR.206.013). EPA would not want to require just combined-cycle facilities to meet the requirement because that would create a disincentive to building new facility combined-cycle plants. See below. See also Chapter 4 of the Technical Development Document and Section V.C of the preamble to the final rule.

EPA agrees that dry cooling is a good technology for reducing impingement and entrainment and would meet the Track I requirements. However, EPA considers the disadvantages of the technology (as explained in Section V.C of the preamble to the final rule) to be persuasive arguments for rejecting dry cooling as best technology available, even on a regional subcategorization basis.

EPA appreciates the data provided by the commenter on recent dry cooling projects. EPA disagrees that the mere existence of the technology at these facilities demonstrates its economic viability, efficiency, or even practicability, as stated by the commenter. EPA's detailed economic analysis of the dry cooling options demonstrates that the technology (as a whole or partial national standard) is, in fact, not economically practicable, nor viable for all new facilities or all new facilities in the New England region.

EPA agrees that dry cooling provides some degree of flexibility to siting of new power plants. However, EPA has weighed this with other concerns referenced in the preamble and finds these other concerns more persuasive. Particularly, EPA is concerned about barrier to entry that may occur, competitive disadvantages, energy efficiency, and the determination that the rule is very effective at reducing impingement and entrainment. The regulatory ease in siting for dry cooling plants is a useful selling point to future power plant projects, and, as such, EPA encourages future plants to consider the technology. However, the value of siting flexibility is overstated by the commenter. The fact that the commenter references portions of the Clean Water Act that have beneficial implications with dry cooling shows that the technology on its own merits has advantages in some but not all situations.

EPA is also concerned with an additional factor related to barrier to entry and competitive equity: the real possibility that regulated entities faced with the prospects of building new facility power plants that are required to utilize dry cooling would instead of beginning or continuing with the new facility project, turn to existing power-plants (many of which are significantly aged) and attempt to extend their operating lives further or refurbish them such that the new facility rule would not apply. The consequences of this action would directly undermine a principle argument made by advocates of dry cooling: that recent advances in the efficiency of power plants has paved the way for the use of the less efficient dry cooling system. (Note: EPA disagrees with the argument that recent advances in power plant efficiency should lessen the consideration of the efficiency of a cooling system. See

response to comment 316bNFR.206.014). In addition to fundamentally misstating costs, technical feasibility, environmental trade-offs, and the energy penalty of the dry cooling system (see responses to comments 316bNFR.206.012, 316bNFR.206.014, and 316bNFR.529.009), the advocates fail to consider that partial (i.e., regional or size based subcategorizations) or full national requirements may have the unintended effect of discouraging new facility combined-cycle plant construction and, instead, encouraging extension of the lives of existing coal-fired plants. Combined-cycle plants have many environmental advantages: they produce significantly less air emissions of NOx, SO2, and Hg per MWh generated, they use much less water for condensing of steam than fossil-fueled or nuclear plants (greater than one-half water use reduction per MWh or generation), and they are significantly more energy efficient in their generation of electricity than comparable coal-fired plants. Therefore, not only would air emissions improvements not be realized for combined-cycle construction, but water withdrawals would potentially proceed forward at current levels deemed inappropriate by the commenter.

Comment ID 316bNFR.006.008

Subject Matter Code 12.12

25% 7Q10

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The flow (capacity) standard proposed in sections VIII. and 125.84 for freshwater streams is not more than the more stringent of 5% of the source water mean annual flow or 25% of the source water 7Q10 flow. This is substantially lower than the flow standard used by the Service since 1981 in the New England states. The Service standard during the summer low flow period is median August flow for unregulated streams with 25 years of gaging records or 0.5 cfsm (cubic feet per second per square mile of drainage) which represents the generic median August flow for regulated and ungaged streams in New England. A Questions and Answers document on the Services' New England Flow Policy is included as an attachment to help explain the flow policy and further substantiate the need for higher flow standards. According to Service standards in New England, when streamflows reach the August monthly median or 0.5 cfsm, projects must cease withdrawal or change operation to ensure that outflow=inflow to provide instantaneous run-of-river conditions. Applicants also have the option under the flow policy to conduct a site specific flow study using a method such as the instream flow incremental method (IFIM). However, these studies have generally been restricted to by-pass reaches at hydroelectric projects as opposed to mainstream reaches in rivers or streams. The August median/0.5 cfsm standard is typically 3 to 5 times greater than the 7Q10 flow or 12 to 20 times greater than 25% of 7Q10 and four times larger than 5% of average annual flow of New England streams which the Service has calculated to be 1.89 cfsm(see Appendix C in the Q&A document). The Service flow standards, i.e., median August, median February, are intended to represent benchmarks for the protection of aquatic life both on a project specific basis as well as on a more generic basis such as in water quality standards. Consequently, the flow standard should be raised significantly higher to avoid conflicts with hydrology standards that have been implemented to protect aquatic life including those in EPA approved State water quality standards if the proposed framework is retained.

EPA Response

See response to comment 316bNFR.502.008.

Comment ID 316bNFR.006.009

Subject Matter Code	12.2
	Lakes/Reservoirs

Author Name Vernon B. Lang

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The framework makes a distinction between lakes and reservoirs, and streams and rivers as shown in Exhibit 1 and more fully described in the preamble and draft rule. This is a cause for concern in the northeast because most reservoirs and many lakes are integral parts of streams or rivers. The framework applies different standards to these water bodies particularly for flow or water capacity standards. In fact, no flow standard is proposed for the lake/reservoir category which would allow a facility sited here to withdraw water and thereby reduce stream flow in the outlet stream without any regulation. This would frustrate the protocol in the rivers category to establish a streamflow threshold on a CWIS located downstream of the lake outlet. The definition of lake in section 125.83 specifically includes impounded sections of streams with an average hydraulic retention time of more than seven days. Reservoir is defined to mean any natural or constructed basin where water is collected and stored. This can be interpreted to mean any impoundment on a stream or river that has some storage component as an integral part of the project which would include virtually all riverine impoundments in the northeast. The definition of lake in section 125.83 needs to be changed such that it only includes those without outlet streams and for those lakes with outlet streams, the definition should require the hydraulic retention time to be ten years or more to help ensure that outlet flows would be minimally affected by cooling water use. Lakes with outlets and hydraulic retention times less than ten years should be placed in a new category or in the river category to ensure that flow (capacity) standards are imposed. The definition of reservoir in section 125.83 should be changed by including a requirement that the reservoir not be located on a perennial stream and not receive storage water from a stream or river during normal low flow periods of the year such as in the summer and winter periods. This would help ensure that reservoirs would be located off-stream and require storage water to be obtained during high flow periods such as during spring runoff and storm events. As in previous sections, these suggestions would be pertinent only if the proposed framework is retained.

EPA Response

EPA is unclear what the commenter means by "no flow standard is proposed for the lake/reservoir category which would allow a facility sited here to withdraw water and thereby reduce stream flow in the outlet stream without any regulation." EPA assumes that any facility which withdraws cooling water from a lake or reservoir will discharge any remaining water to the originating source, thereby not measurably reducing the volume of water in the lake or directly reducing the flow in the outlet stream.

While no percentage restriction is included for lakes and reservoirs in today's final rule, new facilities located on a lake or reservoir are required to establish a maximum intake capacity that will not disrupt the natural thermal stratification or turnover pattern of the source waterbody. EPA believes an "across-the-board" limit is unworkable for lakes and reservoirs since the concept of flow is inapplicable to a lake. In addition, EPA believes preserving some degree of the natural thermal stratification, if present, is desirable because of the increased cooling efficiency that can result. The thermal stratification standard, while different from the flow-based standards for estuaries and

freshwater rivers, does limit a new facility to an intake capacity that will achieve an acceptable level of protection for the source water.

The definition of lake or reservoir in today's final rule includes an average retention time greater than seven days. EPA believes an impoundment with this retention time typically exhibits characteristics more like a traditional lake rather than a free-flowing river. A flow-through reservoir (typically with a retention time less than seven days) exhibits characteristics more like a freshwater river or stream, thus it is categorized as such in today's final rule.

EPA believes the framework and definition changes proposed by the commenter are unworkable for today's final rule and would not necessarily result in a more significant minimization of adverse environmental impact. The suggestion to define lakes as those with retention times of 10 years or more appears overly conservative. EPA cannot find any discussion in the reviewed literature that suggests this as an acceptable alternative.

Comment ID 316bNFR.006.010

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

Another difficulty with the proposed framework is the potential, if not likelihood, to arrive at different regulatory decisions under the CWA depending on whether section 402 or 404 is being used as the regulatory mechanism. This conflict could occur in instances where a specific project needs a section 404 permit to construct a cooling water intake structure and where a NPDES permit is also required to authorize the discharge of cooling water effluent back into waters of the U.S. or perhaps, as the preamble suggests, for discharge of stormwater. The conflict arises because in the New England States, if not the entire northeastern U.S., dry cooling technology has been demonstrated by the steam electric industry to be the least environmentally damaging practicable alternative (LEDPA) in accordance with the 404(b)(1) Guidelines, 40CFR230.10(a). In addition, the widespread adoption and use of dry cooling technology by industry has adequately demonstrated that steam electric generating facilities are non-water dependent activities, that is, they do not require access to, siting in or adjacent to waters of the U.S. to fulfill their basic project purpose. The same disparity noted above would occur under the proposed framework in a hypothetical case where two 500 M.W. projects are located on opposite sides of the same river but where one project only needed a 402 permit since it obtained cooling water from an existing intake and the other project only needed a 404 permit to authorize the CWIS since it could discharge effluent into a municipal treatment plant. The proposed section 402 pathway would result in a closed-cycle recirculating cooling water system as BTA while the section 404 pathway would result in dry cooling as the LEDPA. Most likely, the proposed rule cannot withstand scrutiny when such disparate results are produced under two closely related sections of the CWA.

EPA Response

EPA does not believe such a conflict is likely under the final rule. Today's final rule, implementing section 316(b) of the CWA, does not prescribe specific technologies to be installed by a new facility. Instead, it sets a two-track, technology-based approach, which must be complied with if a new facility is subject to this rule. If, as the commenter suggests, a new facility is required to install dry cooling in order to meet its section 404 obligations, it may choose the Track I option and therefore meet both section 316(b) and section 404 requirements. On the other hand, if a new facility chooses Track II under today's final rule, and performs site-specific studies to evaluate what technologies would be applicable in order to meet its section 316(b) obligations, it may incorporate its evaluation for purposes of section 404 in the process and choose a technology or suite of technologies which would achieve compliance with both section 316(b) and section 404 of the CWA. In the event that requirements under section 316(b) and 404 differ, however, a permittee would need to meet both.

Comment ID 316bNFR.006.011

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Accordingly, the proposed framework in section VIII. of the preamble and section 125.84 of the rule should be modified such that dry cooling is identified as the best technology available for minimizing adverse environmental impact at cooling water intake structures. The four categories of waters could then be deleted along with the location, capacity, velocity, other technology and unspecified requirements contained in the present draft framework since they would not be necessary with a regional or nationwide framework based on dry cooling as BTA. However, if EPA chose to adopt dry cooling as BTA but with a rebuttable presumption which an applicant would have the burden of overcoming, then some aspects of the proposed framework might be useful in the new framework.

Restructuring the proposed rule as suggested herein to establish dry cooling as the best technology available for minimizing adverse environmental impact would provide several important advantages over the proposed framework including, but not limited to:

1.Greater environmental protection particularly for waters of the U.S. and aquatic life;
2.A less complicated and greatly streamlined rule;
3.Consistent across-the-board standards for all waters of the U.S.;
4.Establishes a more levelized regulatory environment for industry;
5.Streamlines the decision making process;
6.Promotes enhanced siting flexibility for new facilities;
7.May enhance the development of more advanced cooling technology and;
8.Eliminates the need for extensive sampling and monitoring studies in waters of the U.S. formerly affected by impingement, entrainment, hydrologic, and thermal effects.

EPA Response

EPA rejects dry cooling as best technology available for a national requirement for the reasons stated in response to comment 316bNFR.006.001.

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements for location, capacity, construction and design of cooling water intake structures at new facilities while also providing flexibility to address site-specific concerns. In establishing this rule EPA identified factors that contribute to AEI, examined technologies that address these key factors, and established requirements based on which of these requirements or combinations of these requirements are available, effective, and economically practicable.

The two-track approach balances the goal of providing regulatory certainty and fast permitting for

new facilities with the goal of also allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Henry T. Graham, Jr.

On Behalf Of:

Louisiana Chemical Assn. (LCA)

Author ID Number:

316bNFR.008

Note

LCA incorporates by reference the comments of LCA members, the ACC (316bNFR.035), and The Fertilizer Institute to the extent such comments are not inconsistent with the comments of LCA.

Comment ID 316bNFR.008.001

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

Need for Regulatory Flexibility.

LCA submits that EPA should retain as much flexibility as possible in the implementation of section 316(b) of the Clean Water Act (the "CWA"). Thus, as more fully reflected in the comments set forth below, LCA submits that where possible, EPA should retain the discretion to apply alternative requirements regarding the location, design, construction, and capacity of cooling water intake structures and the best technology available ("ETA") for minimizing adverse environmental impact. Further, EPA should retain the flexibility under the Proposed Rule to allow alternative measures proposed by the regulated community to ensure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the affected bodies of water.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II.

Track I specifies intake flow, velocity and source water-based flow requirements, as well as, where specified conditions exist, a requirement for the permit applicant to select and implement those design and construction technologies that are most effective in minimizing impingement mortality of fish and shellfish and entrainment of entrainable life stages of fish and shellfish. Under Track I, new facilities that withdraw greater than 2 MGD and less than 10 MGD are not subject to the intake flow requirements but must comply with velocity requirements, source water-based flow requirements, and must select and implement design and construction technologies that minimize impingement mortality in specified circumstances, and that minimize entrainment of entrainable life stages of fish and shellfish in all cases.

Under Track II, a new facility can use any technology to demonstrate that it has reduced the level of adverse environmental impact to a level of performance comparable to that which would be achieved had the facility implemented the intake flow and velocity requirements in Track I. In addition, new facilities are subject to the same source water-based flow requirements required in Track I and the same conditional design and construction requirements that apply to large facilities under Track I. Under both tracks, the rule provides that a facility may be subject to requirements the Director deems necessary to comply with any provision of State law, including compliance with applicable State water quality standards. The final rule also allows a new facility to request alternative requirements when compliance would result in costs that are wholly out of proportion to those considered by EPA in establishing the requirement at issue.

Comment ID 316bNFR.008.002

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Section V. C of the Preamble, 65 F.R. 49066-49067: Scope and Applicability of the Proposed Rule. What is a "Cooling Water Intake Structure"?

LCA submits that the proposed definition of "cooling water intake structure" which includes intake structures if a facility uses 25% or more of the water drawn through the structure for cooling purposes is too restrictive. LCA submits that the 1976 final rule (41 F.R. 17387 (April 26, 1976)) and the 1977 Section 316(b) Draft Guidance definition of "cooling water intake structure" had it right. The Proposed Rule should only apply if a facility uses the major portion of water drawn through its structure for cooling purposes (i.e., if more than 50% of the water drawn through the intake structure is used for cooling by the facility).

LCA otherwise supports the definition of "cooling water intake structure" found in proposed 40 CFR 125.83. In other words, LCA would simply change the definition proposed in 40 CFR 125.83 by increasing the percentage referred to therein from "25" to "50".

EPA Response

EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.008.003

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Section V.D. of the Preamble, 65 F.R. 49067-49068: Scope and Applicability of the Proposed Rule. Must My facility Withdraw Water from Waters of the U.S.?

As noted by EPA, some facilities discharge heated water to cooling ponds, then withdraw water from the ponds for cooling purposes. These cooling ponds are not typical waters of the United States with indigenous populations of shellfish, fish, and wildlife. Nor should they be treated as such under the Proposed Rule. Cooling ponds simply facilitate the recirculation of cooling water and diminish the need for the withdrawal of fresh water from typical waters of the United States for cooling purposes. Thus, LCA submits that EPA should specifically exclude cooling ponds from regulation under the Proposed Rule.

EPA Response

EPA has not categorically excluded new facilities that withdraw water from cooling ponds from the final rule. In some circumstances, cooling ponds can be "waters of the U.S." See definition of "waters of the U.S" (cooling ponds must be evaluated on a case-by-case basis by the permitting authority to determine whether they are "waters of the U.S."

See Response to Comment 316bNFR.068.151.

Comment ID 316bNFR.008.004

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 7.4

Water Withdrawal threshold

LCA further submits that the MGD flow threshold should be as large as possible while still bringing the majority of all new cooling water flows within the ambit of the Proposed Rule. The Proposed Rule will be costly to implement and monitor, both by the regulated community and the regulating agencies. Thus, a strategy which ensures broad coverage but excludes minor facilities and/or flows will be the most beneficial. LCA therefore submits that the minimum MGD threshold should be 25 MGD or more. As noted by EPA, a 25 MGD threshold should subject up to 99.1% of all cooling water flows in the industries that use the largest volumes of cooling water to the Proposed Rule.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA has concluded that the compliance costs for this rule are relatively low. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available.

For further discussion of these points, see Sections VI, A, 3., VI.H., and VIII.

Comment ID 316bNFR.008.005

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Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

Section V.E of the Preamble. 65 F .R. 49068-49070: Scone and Applicability of the Proposed Rule. Must My Facility Have a Point Source Discharge Subject to an NPDES Permit?

LCA submits that where new facilities that have or are required to have an NPDES permit will not directly control the intake structure that supplies their facilities with cooling water, the intake structure should be regulated only if more than one-half of the flow serves the cooling water needs of the new facilities. Any less use of cooling water by the new facilites simply does not justify the burden of compliance with the Proposed Rule. LCA further submits that under such a scenario, any cooling water intake requirements should be imposed only in the permit of the facility that operates the intake structure. As noted by EPA, this would be administratively simpler and would limit permit requirements to the facility with direct operational control of the structure.

EPA Response

EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the 2 MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the US is addressed by the requirements in this rule for minimizing adverse environmental impact under section 316(b) of the CWA. EPA considered it important to cover as many facilities as possible in order to create regulatory certainty for new facilities and for states and tribes that must permit these new facilities. EPA believes that new facilities that use less than 25 percent of water withdrawn for cooling are most effectively addressed on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold. Finally, EPA amended the definition of cooling water intake structures to ensure that the rule does not discourage the reuse of cooling water as process water. See section VI.A.3 for further discussions on EPA's rationale for a 25 percent threshold and section VIII for discussions on the economic analysis that served as basis for this rule. See also section VI.A.4 for a discussion on the applicability of today's rule to NPDES permit holders and those who obtain cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) who is not a public water system.

Comment ID 316bNFR.008.006

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Section VII.D of the Preamble. 65 F .R. 49074-49075: Environmental Impact Associated with Cooling Water Intake Structure. What Constitutes Adverse Environmental Impact Under this Proposed Rule?

LCA agrees with EPA that adverse environmental impact can only occur at a level of impingement or entrainment of aquatic organisms that is recurring and nontrivial. That said, LCA does not believe any numeric or percentage characterization of impingement or entrainment is justified. One size does not fit all. LCA submits that EPA should retain flexibility to determine adverse environmental impact on a case-by-case basis with broad guidance as to what may constitute adverse environmental impact. LCA thus submits that the best standard for defining adverse environmental impact is that found in section 316(a) of the CWA. That is, adverse environmental impact should be defined as impact likely to interfere with the protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife.

EPA Response

Please see response to comment 316bNFR.507.004 and the preamble to the final rule.

EPA does not agree that the CWA compels EPA to link 316(b) adverse environmental impact to the objectives of 316(a) of the Act (i.e., balanced indigenous population). EPA believes that the choice by Congress of different terms in section 316(b) versus 316(a) can be presumed to be intentional and purposeful. Bates v. U.S., 522 U.S. 23 (1997). Please see response to comments 316bNFR.068.007, 316bNFR.068.008, and section VI.B.2.a. of the preamble for the final rule.

Comment ID 316bNFR.008.007

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Section VIII.A.l of the Preamble, 65 F.R. 49079-49083: Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities. What Is the Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities? What Are the Proposed and Alternative Regulatory Frameworks for Today's Proposed Rule?

Again, LCA submits that EPA needs to retain flexibility to deal with the implementation of section 316(b) of the CWA on a site-specific basis. Rigid adverse environmental impact standards and specific listings of technology that must be used to minimize such impacts are unwarranted. Environmental impact and technology to address such impact can be highly dependent on site- specific factors. LCA submits that EPA should adopt a more case-by-case approach in the Proposed Rule and adopt a framework that would resemble the framework EPA proposed in the 1970s. Thus, EPA should implement section 316(b) on a case-by-case, site-specific basis but establish specific decision criteria that the agency will have to consider when determining the appropriate BTA for minimizing adverse environmental impact.

Should EPA fail to adopt this case-by-case approach to determine BTA for minimizing adverse environmental impact, LCA submits that EPA should, at a minimum, allow a new facility, at its option, to provide a demonstration that due to site-specific conditions at the site, some alternative technology or suite of technologies would minimize adverse environmental impact. Thus, if the facility could demonstrate that it would minimize environmental impact even without complying with some or all of the established uniform national requirements relating to flow, intake velocity, and design and construction technologies, such uniform national requirements would not apply.

EPA Response

The historical case-by-case approach requires significant resources on the part of the regulatory authorities that must implement section 316(b) requirements. Demonstration studies are complex and may take years to complete. The iterative nature of the assessment process requires a significant expenditure of resources by both industry and the regulating authorities. The case-by-case approach may also lead to less consistent permitting decisions than if there were national requirements, making planning more difficult for industry and leading to uncertainty from permitting authorities with respect to appropriate requirements for a given type of facility sited under a given type of conditions.

As such, for new facilities EPA is establishing a two-track technology-based approach that sets minimum performance requirements for new facilities. These requirements are both available and economically practicable based on EPA's rulemaking record. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive

for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

EPA understands that there are limitations to some technologies and that they may not be appropriately applied to all facilities to meet the requirements of the new facility rule. This rule was specifically written to allow site-specific determinations by the facility itself as to which technologies would be most appropriate based on their knowledge of conditions at the facility and in the waterbody.

Also see Sections II.C. and IV.B in today's final rule and Section VIII.A. in the proposed rule for further explanation as to why the case-by-case approach was rejected for new facilities.

Comment ID 316bNFR.008.008

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

LCA objects to any national zero or nearly zero-intake flow requirement based on the use of dry cooling systems. Such systems are not warranted in Louisiana, with its abundance of high volume surface waters.

EPA Response

EPA did not select dry cooling as the technology basis for the requirements of the rule for the reasons discussed in Section V.C of the preamble to the final rule. However, EPA notes that the reason presented by the commenter, that surface water abundance should influence EPA's decision is misguided. EPA considers the minimization of impingement and entrainment of organisms in any surface water (whether high or low volume) to be the charter of section 316(b) of the CWA. As such, surface water abundance did not factor into EPA's decisions on best technology available for minimizing adverse environmental impact.

Comment ID 316bNFR.008.009

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 10.12

Request for Comment: Best Technology Available Requirement "Trading"

LCA supports any reasonable mechanism EPA may adopt to facilitate "trading" among components of BTA to achieve equivalent reductions in adverse environmental impact at lower costs (e.g., a reduction of flow below the regulatory requirements which would allow a corresponding increase in intake velocity or the installation of fewer additional design technologies).

EPA Response

EPA believes that it is inappropriate for Track 1 to adopt a trading approach due to the amount of time and analysis it may take to evaluate proposed trading proposals and due to the objective of creating fast permitting in track 1 for new facilities. EPA, has, however, adopted a limited trading approach in Track 2 in the final rule, as discussed in the preamble to the final rule. This approach allows restoration or mitigation measures that provide for additional aquatic organisms to the particular waterbody to as a measure of impingement and entrainment reduction equivalent to the final rule. EPA is not adopting a broader measure – based on population or ecosystem impacts in defining "adverse environmental impacts" because measuring adverse environmental impact in terms of impingement and entrainment is a simpler and requires less time, which EPA views as particularly important in permitting new facilities.

Comment ID 316bNFR.008.010

Subject Matter Code	10.13
Request for Comment: Uniform Set of Standards Applicable to All Facilities	

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

LCA objects to any regulatory framework that would apply the BTA requirements proposed for estuaries and tidal rivers to all facilities, regardless of their location. Simply put, freshwater rivers and streams are different than estuaries and tidal rivers, which are both different than lakes or reservoirs, which are all different than oceans. EPA should not apply the same controls to cooling water intake structures on such different waterbodies.

EPA Response

EPA explains elsewhere in this record why it is not specifying requirements (other than proportional flow) based on waterbody type.

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II.

Track I specifies intake flow, velocity and source water-based flow requirements, as well as, where specified conditions exist, a requirement for the permit applicant to select and implement those design and construction technologies that are most effective in minimizing impingement mortality of fish and shellfish and entrainment of entrainable life stages of fish and shellfish. Under Track I, new facilities that withdraw greater than 2 MGD and less than 10 MGD are not subject to the intake flow requirements but must comply with velocity requirements, source water-based flow requirements, and must select and implement design and construction technologies that minimize impingement mortality in specified circumstances, and that minimize entrainment of entrainable life stages of fish and shellfish in all cases.

Under Track II, a new facility can use any technology to demonstrate that it has reduced the level of adverse environmental impact to a level of performance comparable to that which would be achieved had the facility implemented the intake flow and velocity requirements in Track I. In addition, new facilities are subject to the same source water-based flow requirements required in Track I and the same conditional design and construction requirements that apply to large facilities under Track I. Under both tracks, the rule provides that a facility may be subject to requirements the Director deems necessary to comply with any provision of State law, including compliance with applicable State water quality standards. The final rule also allows a new facility to request alternative requirements when compliance would result in costs that are wholly out of proportion to those considered by EPA in establishing the requirement at issue.

The two-track approach in the final rule provides flexibility for new facilities to account for differences within and between water body categories, while ensuring a level of performance based on best technology available to minimize adverse environmental impact.

Comment ID 316bNFR.008.011

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 13.1

Requirement of 0.5 fps

Section VIII.A.4 of the Preamble. 65 F.R. 49088: Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities. What Is the Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities? Velocity.

As noted in the preamble, mandatory, uniform velocity performance requirements are inappropriate as a means of minimizing adverse environmental impact because many site- and species-specific factors influence both the rate at which a given cooling water intake structure impinges aquatic life and the significance of any such impingement. There are biological, hydrological, and locational reasons why uniform velocity requirements are not appropriate and why velocity standards should be established on site-specific basis. LCA thus submits that design intake velocity should be established on a case-by-case basis. At a minimum, EPA should increase any mandatory, uniform velocity performance standard to no less than 1.0 ft/s on a through-screen basis.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

Finally, EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement.

Comment ID 316bNFR.008.012

Subject Matter Code 15.13

Discretionary/Voluntary Approaches

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Section V111.A.6 of the Preamble. 65 F.R. 49089-49092: The Best Technology available for Minimizing Adverse Environmental Impact at New Facilities. What Is the Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities? What Is the Role of Restoration Measures?

LCA supports a voluntary restoration approach which would allow the agency to consider restoration measures proposed voluntarily by permit applicants in the context of determining the extent to which location, design, and capacity could be modified to reflect site-specific conditions while still ensuring that adverse environmental impact is minimized. Restoration measures could substitute for location, design, and capacity requirements, partially or completely in appropriate cases. The underlying permit could incorporate appropriate conditions relating to voluntary restoration measures. This would provide flexibility to the agency, the regulated community, and other interested parties to address issues posed by cooling water intake structures on a site-specific, priority basis.

Further, LCA would support any "banking" mechanism similar to that used in the CWA section 404 program that would allow the permittee to meet restoration requirements by purchasing "credits" from an approved "bank." Again, the use of banking should facilitate compliance and reduce the burden on the permit applicant, while at the same time potentially enhancing the ecological effectiveness of the required restoration activities.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II. EPA views restoration measures for new facilities in terms of providing comparable performance in reducing impingement mortality and entrainment rather than as a means to determining whether an adverse environmental impact has occurred. Especially for new facilities, EPA believes that reducing impingement and entrainment is the best metric because it is more certain and quick. EPA has not pursued the trading approach in the new facility rule due to the complexity it entails as compared to the Track II approach it has adopted and because EPA did not have time to develop such an idea in time for the proposed rule or NODA in order to give the public ample opportunity to comment. In addition to being concerned about the procedural rights to comment, such an approach would be very new in this context and EPA would need more time to develop how such an approach would be implemented and discuss this fully with stakeholders before adopting such an approach.

Comment ID 316bNFR.008.013

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

Author Name Henry T. Graham, Jr.
Organization Louisiana Chemical Assn. (LCA)

SectionVIII.A.7 of the Preamble, 65 F.R. 49091-49092: Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities. What Is the Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities? Additional and Alternative BTA Requirements.

LCA submits that the Proposed Rule should be revised to provide needed flexibility not only where an individual new facility can demonstrate that cost of compliance would be wholly out of proportion to the cost EPA considered and determined to be economically practical but also where the cost of compliance would be wholly disproportionate to projected environmental benefits. The 1977 Draft Guidance included a similar provision, and it should be allowed under the Proposed Rule. LCA submits that an affected facility should be able to use this wholly disproportionate cost test in addition to the cost test in proposed §125.85(a) (i.e., cost wholly out of proportion to the cost EPA considered in the rule development).

EPA Response

EPA has considered the comment regarding the need for flexibility for facilities to demonstrate that compliance costs are wholly disproportionate with both economically practicable costs and with projected benefits. In response, the final rule allows facilities facing compliance costs wholly disproportionate to those EPA considered and found to be economically practicable the final economic analysis, can seek a variance in accordance with the provisions under § 125.85. EPA's "wholly disproportionate cost" alternative is only to be applied where the applicant can demonstrate that EPA failed to appropriately consider costs in this rulemaking. It is not to substitute for the economic practicability standard, but to provide flexibility in the case where the record for this rule did not account for costs that are faced by a particular facility. As this rule addressed industry costs generally, it would be expected that this provision would most likely be used by a manufacturer in an industry not studied in this rulemaking. See 316bNFR.206.032 for a discussion of the legal basis for the alternative requirements provision in the rule.

Also, see response to 316bNFR.206.014 for an explanation of the cost test used in this rule (economic practicability). For further information on EPA's position on use of the "wholly disproportionate" test for BTA determination, see EPA's response to comment 316bNFR.052.009 above.

Further, the final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. EPA has defined the best technology available for minimizing adverse environmental impact in terms of reduction of impingement and entrainment, an objective measure of environmental benefit. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit

applicant to select and implement design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish. Track II allows permit applicants to conduct site-specific studies to demonstrate that lower cost alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I. EPA is confident that framework provides facilities flexibility in complying with the requirements of this rule.

Comment ID 316bNFR.008.014

Subject Matter Code	16.4
Request for Comment: Provision for Variance for Any National Best	

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Section VIII.A.8 of the Preamble, 65 F.R. 49092-49093: Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities. What Is the Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities? Other Approaches Being Considered by EPA.

LCA submits that the agency's ability to impose more stringent BTA requirements should be limited. Thus, LCA submits that the proposed rule should not be revised to provide the agency more authority to impose additional section 316(b) requirements. National standards are set forth in the Proposed Rule, and proposed §125.84(f) and (g) already provide the agency authority to impose more stringent requirements in certain situations. No additional authority to impose more stringent requirements is warranted.

LCA supports providing the agency additional flexibility to specify alternative, less stringent BTA requirements based on the use of innovative cooling water intake structure design and operation to minimize adverse environmental impact (e.g., artificial filter beds, radial wells, porous dikes, perforated pipes, etc.). Use of such technology may minimize the rates of impingement and entrainment to levels commensurate with those achieved under the Proposed Rule at a lower cost than conventional technologies would allow. Providing the agency the flexibility to allow less stringent BTA requirements in such a situation will encourage the use of innovative technologies while minimizing adverse environmental impact.

EPA Response

Today's final rule recognizes that a State may, under section 401 or 510 of the CWA, ensure the inclusion of any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure at a new facility that are necessary to ensure attainment of water quality standards, including designated uses, criteria, and antidegradation requirements. See further discussion in section V.B.1.d of the preamble. As to the use of innovative technology in new facilities, today's final rule allows and encourages their use by not prescribing specific technologies that must be implemented in order to comply with today's rule. A facility may utilize an innovative technology that will yield the same results expected under today's rule. EPA has established Track II where such demonstration can be done should the applicant desire to make use of an innovative technology.

Comment ID 316bNFR.008.015

Subject Matter Code 125.83.5

Definition: CWIS

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Definitions--Cooling water intake structure.

For the reasons set forth in Comment No.3 above, LCA submits that the definition of "cooling water intake structure" should be revised by increasing the percentage referred to therein from "25" to "50". Thus, at least 50 percent of the water withdrawn must be used for cooling purposes in order for an intake structure to be considered a cooling water intake structure.

EPA Response

See 316bNFR.008.002.

Comment ID 316bNFR.008.016

Subject Matter Code 125.83.13

Definition: Lake

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Definitions-Lake and Reservoir.

LCA objects to the inclusion of any man-made pond (especially cooling ponds, as discussed in Comment No.4 above) within the ambit of the Proposed Rule. LCA submits there is a difference between the typical impounded lake or reservoir and a man-made pond. Impounded lakes or reservoirs should be subject to the Proposed Rule, while the typical man-made pond should not.

Further, waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CW A, are generally excluded from the definition of "waters of the United States." See, definition of "waters of the United States" in 40 C.F .R. 122.2. Such structures should not be regulated under the Proposed Rule, simply because EPA has failed to include the requirement in the definitions of "Lake" and "Reservoir" that such bodies of water must also be waters of the United States.

Admittedly, most man-made ponds will not be of sufficient size to provide intake flows of 2 MGD. However, cooling ponds may be of a sufficient size. Again, as noted in Comment No. 4 above, LCA submits that cooling ponds should be expressly excluded from coverage under the Proposed Rule.

EPA Response

EPA did not intend the discussion of cooling ponds in the preamble to the proposal (65 FR 49067, col. 2) to change the regulatory status of cooling ponds. Cooling ponds are neither categorically included nor categorically excluded from the definition of “waters of the United States” at 40 CFR 122.2. EPA interprets 40 CFR 122.2 to give permit writers discretion to regulate cooling ponds as “waters of the United States” where cooling ponds meet the definition of “waters of the United States.” See December 13, 1993 Memorandum from Robert Perciasepe, Assistant Administrator, to W. Ray Cunningham, Director, Water Management Division (EPA Region 4), “Waters of the United States" Determination for A Proposed Cooling Pond Site in Polk County, Florida. The determination whether a particular cooling pond is or is not “waters of the United States” is to be made by the permit writer on a case-by-case basis, informed by the principles enunciated in Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers (“SWANCC”), 531 U.S. 159 (2001). SWANCC held that usage by migratory birds as habitat was not a basis for asserting Clean Water Act jurisdiction over isolated, intrastate, non-navigable ponds. (EPA notes that § 125. 83 of today’s rule explicitly recognizes that cooling ponds, canals, channels, or lakes can be part of a closed-cycle recirculating system.)

Comment ID 316bNFR.008.017

Subject Matter Code 125.84.1

Compliance in Freshwater

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Proposed 40 C.F.R. 125.84--As an owner or operator of a new facility, what must I do to comply with this subpart?

LCA submits that portions of proposed §125.84 are confusing. For example, subsections (b)(1)(i), (b)(2)(i), (b)(3)(i), and (d)(l)(i) refer to the total design intake flow from "all cooling water intake structures at your facility". LCA submits that the only cooling water intake structures that should be affected at the facility are those cooling water intake structures associated with a "new facility". To the extent a "new facility" is actually part of an existing facility with existing cooling water intake structures (all owned/operated by the same entity), those existing cooling water intake structures should not be subject to the Proposed Rule. EPA should make this clear either in the Proposed Rule itself or in its formal response to comments. The same comment applies under proposed §125.84 in each case where reference is made to "each cooling water intake structure at your facility". See, e.g., Subsections (b)(1)(ii), (b)(2)(ii), (c)(2)(ii), etc.

EPA should review § 125.84 to ensure its punctuation therein is correct. For example, Subsection (b)(2)(iii) ends with ";" rather than a ".". The same is true for Subsections (c)(2)(iii), (c)(3)(iv), (d)(l)(iv), and (e)(2)(iii). (See, also, proposed §125.86(b)(1)(iii) and (v)).

EPA Response

This final rule applies to new greenfield or stand alone facilities: 1) that use a newly constructed cooling water intake structure, or a modified existing cooling water intake structure whose design capacity is increased that withdraws water from waters of the U.S.; and 2) that has or is required to have a National Pollutant Discharge Elimination System (NPDES) permit issued under section 402 of the CWA. Specifically, the rule applies to you if you are the owner or operator of a facility that meets all of the following criteria:

·Your greenfield or stand alone facility meets the definition of new facility specified in § 125.83 of this rule;
·Your new facility uses a newly constructed or modified existing cooling water intake structure or structures, or your facility obtains cooling water by any sort of contract or arrangement with an independent supplier who has a cooling water intake structure;
·Your new facility's cooling water intake structure(s) withdraw(s) water from waters of the U.S. and at least twenty-five (25) percent of the water withdrawn is used for contact or noncontact cooling purposes;
·Your new facility has a design intake flow of greater than two (2) million gallons per day (MGD); and
·Your new facility has an NPDES permit or is required to obtain one.

A new facility subject to this regulation is any facility that meets the definition of "new source" or "new discharger" in 40 CFR 122.2 and 122.29(b)(1), (2), and (4); commences construction after

[insert effective date of the final rule]; and uses either a newly constructed cooling water intake structure, or an existing cooling water intake structure whose design capacity is increased; or obtains cooling water by any sort of contract or arrangement with an independent supplier who has a cooling water intake structure.

As stated above, this rule applies to only "greenfield" and "stand-alone" facilities. A greenfield facility is a facility that is constructed at a site at which no other source is located, or that totally replaces the process or production equipment at an existing facility (see 40 CFR 122.29(b)(1)(i) and (ii)). A stand-alone facility is a new, separate facility that is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same site (see 40 CFR 122.29(b)(1)(iii)). An example of total replacement is as follows: The power plant or manufacturer demolishes the power plant or manufacturing facility and builds a new plant or facility in its place. The pumps of the existing cooling water intake structure are replaced with pumps that increase design capacity to accommodate additional cooling water needs, but the intake pipe is left in place. In this situation, the facility would be a new facility. Modifications to an existing cooling water intake structure that do not serve the cooling water needs of a greenfield or stand-alone facility in 40 CFR 122.2 and 122.29(b)(1), (2), and (4) (i.e., a facility that meets the definition of new source or new discharger and commences construction after the effective date of the rule) do not constitute a new facility subject to this rule. Thus, the definition of new facility under this rule is narrower than the definition of new source under section 306 of the CWA.

The definition of new facility also requires that the greenfield or stand-alone facility use "a newly constructed cooling water intake structure or an existing cooling water intake structure whose design capacity is increased to accommodate the intake of additional cooling water." This means a facility that would otherwise be a "new facility" would not be treated as a new facility under this rule if it withdraws water from an existing cooling water intake structure whose design capacity has not been increased to accommodate the intake of additional cooling water. Routine maintenance and repair, such as replacement of pumps that does not increase the capacity of the structure, cleaning in response to biofouling, and repair or replacement of moving parts at a cooling water intake that is part of a greenfield or stand-alone facility, and that occur simply for operation and maintenance purposes, would not be a modification of that intake structure. One way to distinguish whether replacement of the pipes or the pumps is for maintenance and repair purposes or whether it is to accommodate construction of a new facility is to determine whether the replacement increases the original design capacity. Today's rule specifies that changes to a cooling water intake structure are considered modifications for purposes of this rule only if such changes result in an increase in design capacity. Thus, routine maintenance or repair of the cooling water intake structure, including the pumps, that does not result in an increase in design capacity does not modify a cooling water intake structure. However, if a change is made to the cooling water intake structure, including the pumps, that increases design capacity to any extent, then the cooling water intake structure has been modified; use of this structure by a greenfield or stand-alone facility would make the facility a new facility subject to this rule.

Comment ID 316bNFR.008.018

Subject Matter Code 125.85

Alternative Requirements

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Proposed 40 C.F.R. 125.85--May alternative requirements be imposed?

LCA supports the concept embodied in proposed §125.85 that would allow intersested persons to request alternative requirements less stringent than those proposed in § 125.84(a)through (e). LCA believes this provision provides needed flexibility to the agency to allow less stringent requirements to meet BTA in appropriate circumstances. However, LCA believes this flexibility should be expanded. See, Comment No.10 above.

EPA Response

EPA believes that today's rule embodies the needed flexibility for permit applicants and permit writers to achieve a reasonable, affordable and protective permit which furthers the intent of section 316(b) of the Clean Water Act. Track II of today's rule is the proper mechanism to allow for the applicant to make a demonstration of alternative technologies which may still achieve the objectives of the rule. The alternative requirements provision of 125.85 applies only when an applicant's costs of compliance are wholly out of proportion to the costs considered by EPA in developing today's rule. For further discussion on the intent of today's variance, see response to comment 316bNFR.039.027 and section VII.H of today's preamble.

Comment ID 316bNFR.008.019

Subject Matter Code 125.88

Records and Reporting

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Proposed 40 C.F.R. 125.88--As an owner or operator of a new facility, must I keep records and report?

Under subsection (a), records are required to be kept for a period of at least three years from the date of permit issuance. Is this correct? Should records showing compliance under §125.86 and providing compliance monitoring data under §125.87 be kept for a period of at least three years from date prepared?

EPA Response

A three year period to maintain records is a typical requirement for many NPDES permits. Sections 122.21(p) and 122.41(j) require permitees to maintain records of application materials and reports required by the NPDES permit for at least 3 years.

Comment ID 316bNFR.008.020

Subject Matter Code 125.89

Director's Responsibilities

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Proposed 40 C.F .R. 125.89--As the Director, what must I do to comply with the requirements of this subpart?

Under subsection (b), the Director must review materials submitted for each permit renewal or reissuance. Is the Proposed Rule intended to imply to new facilities when they are no longer new facilities? That is, is the Proposed Rule intended to apply to those facilities which have had a permit issued under the Proposed Rule for five years and are seeking permit renewal? LCA submits that these facilities are no longer "new facilities". Thus, these facilities should not be covered under the Proposed Rule, and the Proposed Rule should be modified accordingly.

EPA Response

Today's rule applies to new facilities that begin construction after the effective date of today’s final rule. (See Section I.A. of the preamble to today's rule for further information on the definition of a new facility) Any facility built after this effective date will be considered a new facility for the length of its operating life, including the permit renewal process, and will continue to be subject to the requirements of the new facility rule.

Comment ID 316bNFR.008.021

Subject Matter Code 125.89

Director's Responsibilities

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Under subsection (c)(2), LCA assumes that the ability of the Director to modify the monitoring program during the term of the permit based on changes in physical or biological conditions in the vicinity of the cooling water intake structure must be supported by a reopener clause in the relevant permit. Absent such a reopener clause, does EPA intend this provision in subsection (c)(2) to be an additional cause for modification of a permit under 40 C.F .R. 122.62? If so, should EPA revise 40 C.F.R. 122.62?

EPA Response

A generic reopener clause is a commonly used mechanism in many NPDES permits. However, individual permit writers may choose to also include specific language to directly address the conditions under which the frequency of monitoring may be re-evaluated.

Comment ID 316bNFR.008.022

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

LCA also submits that the use of a higher threshold (such as 25 or 30 MGD) should be appropriate where a facility uses 10% or less of a waterbody at critical low flow periods. A number of LCA facilities have cooling water intake structures on the Mississippi River between Baton Rouge and New Orleans. With the tremendous flow of the river, LCA submits that even with these higher intake flows, there is little likelihood of adverse environmental impact from these cooling water intake structures on the river. The lower 2 MGD flow threshold simply increases the regulatory burden with little or no environmental benefit.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities who could technically achieve and economically afford the requirements of the rule would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

No percentage flow threshold has been added to the applicability provisions of the final rule. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities. For further discussion of these points, see Sections VI.A.3, VI.C, and VI.D of the preamble to the final rule.

Comment ID 316bNFR.008.023

Author Name Henry T. Graham, Jr.

Organization Louisiana Chemical Assn. (LCA)

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

LCA objects to any MGD flow threshold less than 2 MGD, even for facilities located on smaller waterbodies. As noted by EPA, EPA expects broad coverage using the minimum 2 MGD flow threshold. Reduction of the flow threshold--even if coupled with a requirement that the facility withdraw more than one percent of the mean annual flow of a freshwater river or stream, the mean annual volume of a lake or reservoir, etc.-- simply adds to the regulatory burden without a significant benefit to the environment.

At a minimum, should EPA decide to include a flow threshold based on a facility's withdrawal as a percentage of waterbody flow or volume (e.g., 1% of waterbody flow or volume), LCA submits that EPA should also establish an absolute minimum flow threshold of no less than 200,000 gallons of waters of the United States used on daily basis for cooling purposes. Otherwise, small users of waters could bear enormous costs to achieve compliance with the Proposed Rule.

EPA Response

No percentage flow threshold has been added to the applicability provisions of the final rule. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD based in part on economic considerations. See discussion in sections V, VI.C. and VI.D of the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Shirley M. Ruffin

On Behalf Of:

SCANA Services, Inc.

Author ID Number:

316bNFR.009

Comment ID 316bNFR.009.001

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Shirley M. Ruffin

Organization SCANA Services, Inc.

EPA did not attempt to define adverse environmental impact in the proposed rule; however, the Agency did consider alternatives for defining adverse environmental impact. EPA should define adverse environmental impact since the entire 316(b) program is based on "minimizing adverse environmental impact". If "adverse environmental impact" is indefinable, then serious questions must be raised concerning the purpose or usefulness of regulations that implement section 316(b).

EPA Response

EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.).

Comment ID 316bNFR.009.002

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Shirley M. Ruffin

Organization SCANA Services, Inc.

Of the five alternatives presented, the fifth one (page 49705, column 2, paragraph 1) is preferred. This definition focuses on the 1) protection of threatened, endangered or otherwise listed species, 2) protection of socially, recreationally, and commercially important species, and 3) protection of community integrity.

The third alternative should be rejected. To assume that the loss of any individual aquatic organisms constitutes "adverse environmental impact" completely disregards current scientific knowledge concerning the response of populations to the loss of individuals. The remaining alternatives also have flaws as follows:

The first alternative relies on an arbitrary one percent of the organisms in the near-field area
The second alternative relies on yet to be established guidance regarding the magnitude of environmental effects
The fourth relies on "reference sites", which given the state of development in the United States, may prove difficult to identify. Adverse environmental impacts should be assessed at the community or population level.

EPA Response

Please see response to comment 316bNFR.507.004 and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.009.003

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Shirley M. Ruffin

Organization SCANA Services, Inc.

It appears that EPA, in developing its new facility framework, has assumed adverse environmental impact for any facility withdrawing water from the littoral zone of fresh, estuarine, or ocean waters. In all cases, intake flow is to be restricted to that comparable to a closed-cycle recirculating cooling water system and intake velocity is restricted to 0.5 fps or less. Intake flows are also restricted based on stream flow where intakes are located on streams or rivers.

In addition to the aforementioned restrictions, facilities with intakes located in the littoral zone must implement additional technologies to minimize impingement/entrainment and maximize survival. EPA states that it considers location to be the most important factor in addressing adverse environmental impact caused by cooling water intake structures. Location may well be the most important factor, however there can be considerable variation between sites. There may be considerable differences between sites classified as "littoral", even on the same body of water. Substrate, topography, turbidity, water level fluctuations, velocity, and the presence of vegetation all can influence the productivity of a littoral zone. It should not be assumed that all littoral zones require the same level of protection. Based on site-specific conditions, additional technologies may not be necessary to minimize adverse environmental impact.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.009.004

Author Name Shirley M. Ruffin

Organization SCANA Services, Inc.

Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

On page 49080 (column 1, final paragraph), EPA addresses the potential of establishing a "rebuttable presumption", which would allow a facility the option of providing a demonstration that alternative technology, due to site-specific conditions, could minimize adverse environmental impact. This option seems appropriate and reasonable, as long as "adverse environmental impact" is defined. This option would allow some needed flexibility into the proposed rule.

EPA Response

The final rule does not adopt the "rebuttable presumption" approach, but the EPA two-track approach is comparable to it. The two-track approach balances the need to provide clarity, consistency, and faster permitting by specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, by allowing a new facility to demonstrate performance comparable to that achieved in Track I through other means under Track II. Thus, the two-track approach provides the substantive advantages of the rebuttable presumption alternative. EPA believes it represents an improvement over the "rebuttable presumption" because permit applicants need not rebut a presumptive set of requirements, but must demonstrate that a site-specific alternative set of requirements meets the required level of performance. However, EPA has discussed "adverse environmental impact" in Sections III and VI.B of the preamble to the final rule. In addition, Track I establishes the requisite level of performance for the more flexible Track II requirements.

Comment ID 316bNFR.009.005

Author Name Shirley M. Ruffin

Organization SCANA Services, Inc.

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

One alternative being considered by EPA is a "zero intake flow" alternative (page 4980, column 3, paragraph 2) which relates to flow levels achievable with dry cooling systems. A restriction to "zero intake flow" level seems unreasonable for much of the country, particularly in the southern states. A "zero intake flow" requirement could only be economically justified based on local site conditions.

EPA Response

EPA agrees with the commenter and has rejected dry cooling as best technology available for the reasons discussed in Section V.C of the preamble to the final rule.

Comment ID 316bNFR.009.006

Author Name Shirley M. Ruffin

Organization SCANA Services, Inc.

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

On page 49082, EPA describes an alternate regulatory framework which consists of a three-tier system. The three-tier system allows the facility to perform site-specific evaluations to determine the risk of adverse environmental impact and to determine Best Technology Available (BTA). This framework appears to offer the most flexibility to the facility while ensuring, through Director interaction, that site-specific BTA is implemented. This framework could also be used in conjunction with the "rebuttable presumption" mechanism discussed earlier to offer both generic and site specific BTA options.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See responses to 316bNFR.008.001. Also see 316bNFR.009.004 (rebuttable presumption).

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Hon. Chris R. Wogan & Hon. Keith R. McCall

On Behalf Of:

House of Representatives,
Commonwealth of Pennsylvania

Author ID Number:

316bNFR.010

Comment ID 316bNFR.010.001

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Hon. Chris R. Wogan & Hon. Keith R. McCall

Organization House of Representatives, Commonwealth of Pennsylvania

As Chairs of the Pennsylvania House Consumer Affairs Committee, we urge you to consider some serious difficulties which could be experienced by both large and small consumers, should proposed changes to EPA's Clean Water Act rule 316(b) be adopted.

On September 20, 2000, this Committee held a formal public hearing on the subject of electric reliability. Witnesses testified that, in order for electric generation capacity to be sufficient to meet the public's rapidly-growing demand, new generation plants must be constructed in a timely manner. One cause of California's steep price spikes this summer was inadequate supply, in large part due to siting problems in that state.

In the interest of providing the public with a reliable and reasonably-priced supply of electricity, we encourage allowing states the option to consider plant permitting requirements on a site-by-site basis, rather than imposing a one-size-fits-all rule. Since numerous environmental safeguards already exist, further burdens would discourage plant development, and could very well jeopardize the safety, health, and prosperity of our constituents as well as citizens nationwide.

EPA Response

See response to comment 316bNFR.008.007 and the preamble for information on why EPA is not adopting a case-by-case approach for today's rule.

EPA believes that today’s rule will not be an impediment to the siting and construction of new facilities, nor will it substantially impact the reliability of electricity. In fact, the two-track approach taken in this final rule will improve reliability of electricity by increasing certainty for new facilities. Under Track I in the final rule, facilities can build a power plant without any required pre-permit monitoring. This fast track permitting process enables applicants to obtain permits and begin constructing new facilities to meet growing demand for electricity without any undue delays.

Additionally, while Track I requirements to reduce capacity commensurate with the use of a closed-cycle, recirculating cooling system and to select and install design and construction technologies would result in an additional use of electric power at a power plant not already planning to use these technologies, the magnitude of the electric use compared with total electric supply at the national level is negligible (i.e., less than 0.02 percent (89 MW) of projected new capacity). As such, EPA does not consider this to be a substantial impact on the reliability of electricity supply.

Also see Section VI.H.4. for additional information on electricity reliability.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Unsigned

On Behalf Of:

National Association of Manufacturers

Author ID Number:

316bNFR.011

Note

No comments were coded for this letter. The text and author are the same as 316bNFR012.

Comment ID 316bNFR.011.001

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

No comments were coded for this letter. The text and author are the same as 316bNFR.012.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Unsigned

On Behalf Of:

National Association of Manufacturers

Author ID Number:

316bNFR.012

Note

Text of comments coded. Letter replaced 316bNFR.011.

Comment ID 316bNFR.012.001

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 7.4

Water Withdrawal threshold

EPA Should Set a Reasonable Threshold for Application of the Section 316(b) Rules

The National Association of Manufacturers (NAM) – 18 million people who make things in America – the nation's largest and oldest multi-industry trade association representing 14,000 member companies (including 10,000 small and mid-sized manufacturers) supports the inclusion of a threshold for application of the 316(b) standards for new facilities, which would avoid applying burdensome procedures to thousands of intake structures with little or no potential for causing adverse environmental impact.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.012.002

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Unsigned

Organization National Association of Manufacturers

The NAM is not in agreement that the EPA has made a good case in setting the 2 million gallons per day (mgd) threshold based upon the Athens' case in New York. The threshold should be substantially higher. The NAM is aware of critiques offered by the Edison Electric Institute (EEI), American Petroleum Institute (API) and the American Forest and Paper Association (AF&PA) on the Athens' case and concurs with these technical critiques of this case.

EPA's goal should be to assure that the resources of the regulatory agencies and the regulated public is focused on the type of situations that present significant potential for causing adverse environmental impact and, therefore, warrant further investigation.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.012.003

Subject Matter Code EXIST

Existing Facility Rule

Author Name Unsigned

Organization National Association of Manufacturers

While the Aug. 10, 2000, proposed rule addresses new facilities, it must be evaluated in the context of the anticipated rule for existing facilities. The regulatory burden U.S. industry faces - and the burden that the state and federal regulatory authorities will face overseeing and responding to companies efforts to comply with 316(b) regulations - will be imposed by both the new facility and the existing facilities rules. Thus, it is important for the EPA to establish an appropriate threshold now for determining which cooling-water intake structures will be subject to scrutiny under the section 316(b) regulations. This does not necessarily mean that the thresholds have to be the same - there might be an argument for a higher threshold for existing structures, for example, based on the fact that their impacts have already been experienced and can be determined empirically to be insignificant - but the NAM believes it is still important for the EPA to include realistic de minimis thresholds in the new facility rule.

EPA Response

EPA is not establishing thresholds for the existing facilities in today's final rule. Today's rule establishes thresholds applicable to new facilities which are subject to today's rule under 125.81. See the preamble to today's rule.

Comment ID 316bNFR.012.004

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 7.4

Water Withdrawal threshold

When Congress enacted section 316(b), it was responding to 1960s' studies that suggested that some very large electric-utility cooling-water intake structures, sited in sensitive locations and, removing billions gallons a day, could be having a significant effect on aquatic populations. It would be inappropriate for the EPA to take that concern about a few huge intake structures and use it as the reason for imposing regulatory burdens on thousands of cooling-water intake structures, including many relatively small ones - especially since, there is no evidence of which we are aware that these smaller structures have had any significant effect on surface waters. An intake structure that is designed to withdraw 10 mgd or less is just a small fraction of most electric utility cooling-water intake structures (and even of some intake structures in the larger manufacturing industries).

An intake structure withdrawing up to 25 mgd is still just a fraction of the size of most electric-utility intake structures. In addition, if the EPA adopts the proposed language the NAM proposes below, an intake structure between 10 and 25 mgd would be exempt only if it withdraws less than 10 percent of the stream flow, even at critical low flow, which can be only 1 percent or less of annual average stream flow. Such an intake obviously presents little threat to a healthy, productive aquatic community, which, as noted elsewhere in these comments, is the standard by which EPA should be evaluating adverse impact.

The EPA certainly has the discretion to set thresholds for regulation - it has done so in numerous effluent guidelines, and the concept is even endorsed in the NRDC v. Train consent decree, 8 E.R.C. 2120 (D.D.C.1979). The EPA's establishment of size cut-offs for the new source review program under the Clean Air Act, for example, was upheld by the U.S. Court of Appeals for the D.C. Circuit, which found that the EPA has inherent authority to decide not to impose requirements of a statutory program where "the burdens of regulation yield trivial or no value." Alabama Power v. Costle, 636 F.2d 323, 361 (1979).

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. In addition, the trend in power generation is toward, on a per facility/per unit of output basis, a general reduction in cooling water intake flow levels over time. Combined-cycle gas turbines require less water per unit of electricity generated than coal-fired or nuclear facilities. For example, a 750 MW combined-cycle facility with evaporative cooling towers is estimated to require approximately 7 to 8 MGD and under a 10 MGD threshold would not be subject to this national rule. The Agency believes that, given the objective of section 316(b), it is undesirable to exclude such a large plant from this rule. As reductions in cooling water intake flow levels occur, the two MGD threshold also ensures that this rule can serve the State, Tribes, and permit applicants by assuring that permits for new facilities comply with 316(b).

It is also important to note that EPA has removed the low flow percentage threshold from proportional flow requirements of the rule. EPA believes the mean annual flow provides a sufficient measure of the conditions EPA seeks to protect.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.012.005

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 23.4

Other Requirements (UMRA, RFA, SBREFA)

The EPA also has a statutory obligation under the Small Business Regulatory Enforcement Fairness Act (SBREFA) to consider ways to minimize the adverse impact of its regulations on small businesses. Thousands of small businesses have cooling-water intake structures that would be swept into the 316(b) regulations if EPA does not set a reasonable threshold for regulation. Complying with this additional regulatory program - both in terms of the studies required and in terms of complying with location, design, and operation standards - would be a significant burden for all facilities, especially for small businesses; regulatory agencies would be diverted into assisting small businesses with complying with these unnecessary requirements, as well.

EPA Response

The commenter misstates the requirements of the Regulatory Flexibility Act. Moreover, EPA disagrees with the commenter's conclusion that thousands of small businesses will be affected by the rule. The Regulatory Flexibility Act requires agencies to prepare a final regulatory flexibility analysis when promulgating a final rule for which publication of a general notice of proposed rulemaking was required. In preparing such an analysis, the agency must consider alternatives to proposed rules that minimize the impact on small entities and describe these in the analysis. The requirement to prepare a regulatory flexibility analysis (with the described content) does not apply, however, to any rule which the head of an agency certifies will not have a significant economic impact on a substantial number of small entities. The EPA Administrator has certified that this rule will not have such an impact. EPA has evaluated the economic impacts of the final rule on small entities, as explained in the preamble to the final rule at Section X, D. EPA's assessment shows that very few facilities owned by small entities will be affected by the rule, and that for those that will be affected, the effects will not be great. The Agency has therefore certified that this rule will not have a significant economic impact on a substantial number of small entities (see also Chapter 8: Regulatory Flexibility Analysis in the Economic Analysis document).

The rule is expected to regulate only a small number of facilities owned by small entities, representing a very small percentage of all facilities owned by small entities in their respective industries. The absolute number of small entities potentially subject to this rule is low. This is not unexpected since the total number of facilities subject to this rule is also low (121 new in-scope facilities over 20 years). In addition, facilities that operate cooling water intake structures subject to this rule tend to be large industrial facilities that are generally not owned by small entities (see also Chapter 3: Profile of the Electric Power Industry and Chapter 4: Profile of Manufacturers in the Economic Analysis document).

A further reason why the final rule does not have a significant economic impact on a substantial number of small entities is that EPA has established a two MGD design flow threshold as the level below which facilities would not be subject to the requirements of the rule. This minimum flow level exempts many facilities using small amounts of water, including facilities owned by small entities. EPA also exempted electric generators with design intake capacities between 2 and 10 MGD from

the most costly requirement of the rule (the recirculating requirement), further reducing the burden on small facilities.

Comment ID 316bNFR.012.006

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 7.4

Water Withdrawal threshold

Since the New Source Rule under 316(b) will affect our member companies more significantly, due to retrofits of existing intake structures, we believe the EPA should consider many threshold options in that rulemaking process.

We believe that the following language, if included in both the existing source and the new source cooling-water intake structure regulations, would help minimize the regulatory burden on businesses, including small businesses, and on regulatory agencies, while focusing attention on those intake structures that are reasonably likely to warrant evaluation to determine whether they may be causing adverse environmental impact. Large numbers of small intake structures will simply need to know the design capacity of the intake structure; some others will also have to determine the 7Q10 for the surface water from which they are withdrawing cooling water. The 7Q10 stream-flow limitation is a conservative requirement and avoids the potential for a facility drawing a significant portion of the stream.

The NAM suggests that the EPA substitute the following language for the third clause of proposed 40 C.F.R. § 125.81:

This subpart does not apply to a new facility that proposes to use a cooling-water intake structure with a design intake flow:

(a) less than or equal to 10 million gallons per day; or

(b) greater than 10 million gallons per day but less than or equal to 25 million gallons per day, provided that such flow does not exceed -

(1) 10 percent of the lowest average seven consecutive day low flow, with an average recurrence frequency of once in 10 years determined hydrologically (7Q10) of the source water, for a non-tidal river;

(2) 10 percent of the mean annual volume of a lake or reservoir;

(3) 10 percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low-water level, for a tidal river or estuary.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use

substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA has concluded that the compliance costs for this rule are relatively low. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.012.007

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 7.4

Water Withdrawal threshold

For new facilities, because there is no actual flow experience and the design flow is readily available, we agree with EPA's proposal to apply the threshold to intake design flow.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.012.008

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code EXIST

Existing Facility Rule

When the EPA develops a threshold for the Existing Facility Rule, though, reliance on design flow would be inappropriate for several reasons. First, design flow may not be ascertainable for older facilities, and the facility may actually be withdrawing more water than the intake structure design flow. Most importantly, design flow will often substantially overstate the true impact that the intake structure has on the source water.

Second, many facilities have actual intake flows far below the intake structure design flow, either because the intake structure was over-designed or because the facility has substantially reduced its water usage over time. Treating such an intake structure as if it really were withdrawing at a much higher rate and, therefore, as if it has greater potential to affect the source water would be unrealistic. It also would remove an incentive for further water-usage reductions: If a facility is "stuck" with its intake structure design flow, regardless of how much it reduces its cooling water needs, there is no incentive in terms of application of section 316(b), for the facility to reduce its water usage.

Thus, in the Existing Facility Rule, EPA should substitute "actual intake flow" for "design intake flow" in the proposed regulatory language above and should include a definition of that term. We suggest that "actual intake flow" be defined as "the highest 30-day average intake flow during the last five years." This is a number that should be easy for facilities to determine, and it would assure that any peak withdrawal periods are not being masked by a longer averaging period.

EPA Response

See response to comment 316bNFR.012.003 and the preamble to today's rule.

Comment ID 316bNFR.012.009

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

The 2 mgd threshold the EPA has proposed would not limit the burdens of the rule to only those intake structures for which some further evaluation is warranted on the source water. The potential additional requirement for exemption for the rule that the EPA discussed in the preamble, which would bring back into the rule intakes smaller than 2 mgd that withdraw more than 1 percent of the mean annual flow, would render the de minimis threshold even less useful, without any environmental justification.

EPA Response

No percentage flow threshold has been added to the applicability provisions of the final rule. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities. For further discussion of these points, see Sections VI.A.3, VI.C and VI.D. of the preamble to the final rule. Also see 125.84(b)(3) and 125(c)(2).

Comment ID 316bNFR.012.010

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

The EPA offers no justification at all for its contemplated additional requirement that the intake not remove more than 1 percent of the annual stream flow. There is no reason to conclude that withdrawing 1 percent of the stream flow would adversely affect the aquatic population, even if one assumes that all of the organisms in that water would be unable to escape the intake and that none of those impinged or entrained would survive (both of which are demonstrably false assumptions). If the EPA adopts an appropriate definition of "adverse environmental impact, focusing on effects on the indigenous population rather than effects on individual organisms, it should be clear that a 1 percent threshold is unnecessary - and unnecessarily low.

EPA Response

See response to 316bNFR.062.006.

Comment ID 316bNFR.012.011

Subject Matter Code	7.1

Definition: New Facility

Author Name Unsigned

Organization National Association of Manufacturers

Definitions on New and Existing Facilities Need Clarity

If the EPA proceeds with the approach in the proposed standard for new facilities, setting stringent default requirements for location and operation of cooling-water intake structures, it definitely will be necessary to develop a different set of requirements for existing facilities. As the EPA noted, at 65 Fed. Reg. 49064, there are numerous ways in which existing facilities will be more limited in their ability to comply with specific requirements - such as limitations on the location of the intake structure or the percentage of the receiving waters withdrawn through the structure - because the facility's location is fixed and its manufacturing equipment has already been designed and installed.

The EPA must clearly define the applicability of the proposed rule, so that it only covers a "greenfield" plant or a new, substantially independent plant that is colocated with an existing plant and requiring a new or expanded intake structure. The EPA should make it clear that the "substantially independent" test is based on whether the facility owner could practicably locate the facility elsewhere, since the EPA has based the proposed new facility requirements on the assumption that the owner has the option of choosing the location for the facility to allow him to comply with the intake structure location and operation requirements. Also, for these reasons, the EPA should specifically recognize that a cogeneration plant would not be considered substantially independent from the industrial facility to which it provides thermal energy, and therefore would not be considered a "new facility", unless it was constructed at a greenfield site.

EPA Response

This rule applies to new facilities. Existing facilities will be addressed under future rulemakings (i.e., Phase II and Phase III).

See response to 316bNFR.030.003.

With regard to defining when a facility is substantially independent under 40 CFR 122.29, EPA does not believe it is feasible to project under what circumstances owners and operators are free to select any location they desire for a new facility. For this reason, and to make this rule fit well within the existing NPDES program, EPA takes the facility as it is planned for purposes of determining whether it is a new facility and uses the existing regulations to the extent possible. In the final rule EPA does not believe it is appropriate to define the phrase “substantially independent” as used in 122.29(b)(1)(iii) as facilities that could be practicably located at a separate site. Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether ... processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." EPA does not think it is feasible for the permit authority to judge whether the facility could have been elsewhere for the purpose of determining

whether the facility is subject to the new facility rules.

Comment ID 316bNFR.012.012

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Unsigned

Organization National Association of Manufacturers

Process and Cooling Water

Industrial facilities often preheat process water with energy captured from operations inside the facility. A common way of doing this is to run the water first through a use where heat will be transferred to the water (such as a steam condenser) and then use it for other for process purposes. This practice conserves both water and energy. Because of the clear environmental advantages of reusing this water, and capturing what would be otherwise wasted energy, such waters should be excluded from the definition of cooling water.

Many manufacturing facilities have made (or are in the process of making) changes to reduce water usage; a diversion of capital into another requirement will only delay process-water reductions that would result in reduced water intake volume. Moreover, treating process-water [which also performs a cooling function as "cooling water" for purposes of applicability of 316(b) standards] will in some cases compel facilities to cease this practice, with substantial adverse environmental and energy consequences.

It would simply not be possible, for example, for an industrial facility to recirculate its process water comparable to a "closed-cycle recirculating cooling-water system," nor may it be possible to reduce process-water use to achieve the intake-flow requirements of the proposed rule.

Industrial facilities would be forced to separate their cooling-water from their process water to meet these standards for cooling water intake structures, with the result that they would lose the benefit of recovering waste heat for process purposes.

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling

water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.012.013

Subject Matter Code MISC

Miscellaneous Comment

Author Name Unsigned

Organization National Association of Manufacturers

Cogeneration

New CWIS established for cogeneration purposes should not be subject to rigid requirements as new sources. The EPA also needs to include special provisions dealing with cogeneration units. A cogeneration unit is energy efficient because the thermal energy used to produce electricity is also used for another process. In many cases, this involves a fossil-fuel-fired boiler or combined-cycle gas turbine, in which steam generated in the boiler or in a heat-recovery steam generator after a gas turbine, is first used to drive a turbine generator and subsequently is used for process steam requirements at an industrial facility (the “steam host”).

There may be numerous other interconnections between the cogeneration unit and the steam host: Boiler feedwater may be supplied by the steam host, and condensed steam from the industrial process may be returned to the cogeneration unit, for example. Boiler shell or turbine cooling water, or cooling water used to condense steam may then be used as process water for the steam host. The cogeneration unit may be owned by the steam host or, just as frequently, may be owned by a third party that enters into a contractual agreement with the steam host (which may include leasing the property for the cogeneration unit from the steam host).

Congress and the Administration have shown a strong interest in encouraging cogeneration, and that interest is also reflected in EPA regulations, such as NSPS for electric-utility steam-generating units in 40 C.F.R. Part 60 Subpart D and rules for the acid-rain program in 40 C.F.R. Part 72. Similarly, the EPA must assure that section 316(b) regulations for new sources not have the unintended effect of precluding or seriously disadvantaging new cogeneration units at existing facilities.

Since a cogeneration unit must be located close to an industrial facility, section 316(b) requirements for the location of new cooling-water intake structures and limiting them to a certain percentage of stream flow, for example, could effectively prevent the use of cogeneration at a particular existing industrial or agricultural facility. Meeting a required minimum cooling-water recirculation rate may be impossible, or at least undesirable, for a cogeneration unit, where cooling water from the cogeneration unit may subsequently be reused as process water by the steam host (for improved energy efficiency), and then treated and discharged.

Because a cogeneration unit may be considered to be engaged in a different type of activity (electricity generation) than the steam host it is associated with, the cogeneration unit might be considered a "new source" under 40 CFR § 122.29(b)(1). The EPA needs to build sufficient flexibility into the new source standards to accommodate the special issues that cogeneration units present, as described above. The rigid requirements of proposed 40 CFR § 125.84 would stifle the development of cogeneration at existing industrial facilities.

EPA Response

EPA disagrees that cogeneration plants, in general, should not be subject to the requirements of a new facility under the § 125.84. The Agency understands the operation of a cogeneration plant and does not believe that the new facility rule will preclude or seriously disadvantage new cogeneration units at existing facilities. The revised new facility regulatory language clearly states that the rule applies only to greenfield and stand alone facilities and excludes new units that are added to a facility for the same general industrial operation or that serve as an integral part of the existing facility's operation. However, cogeneration facilities would be included in the definition of new facility if the facility is a separate and independent operation and the cooling water intake structure used by the existing facility is modified by constructing a new intake bay for the cogeneration facility or is otherwise modified to increase the intake capacity of the cooling water intake structure.

In addition, EPA recognizes the environmental benefits of reusing cooling water for process needs and vice versa. Hence, EPA has revised the definition of cooling water to consider heated cooling water that is subsequently used in a manufacturing process to be considered process water for the purposes of calculating the percentage of a new facility's intake flow that is used for cooling purposes in § 125.81(c). If less than 25 percent of the water withdrawn is used for cooling purposes then the facility is not subject to this rule. Therefore, a facility that may subsequently reuse cooling water from its cogeneration unit as process water potentially may not be subject to this rule or at the very least gets credit for the portion of the cooling water that is reused and must only recirculate the cooling water that is not reused as process water.

Comment ID 316bNFR.012.014

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 9.44

Request for Comment: Definition of AEI

Adverse Environmental Impact (AEI)

The NAM has considered the substantial and impressive work conducted by EPRI (formally the Electric Power Research Institutes) and the utility industry to better define adverse environmental impact. The NAM defers to the Utility Water Action Group's (UWAG) policy proposal (offered in comments as the “preferred alternative”) to address AEI. The NAM believes that UWAG and the work from EPRI better describe a system for defining aquatic health through fish population studies. We defer to the electric-utility industry on this point, and strongly endorses the concept of determining fish and aquatic health and vitality, based upon fish population - rather than on the possible arbitrary determination of Adverse Environmental Impact with the impingement or entertainment of one fish.

EPA Response

Please see response to comment 316bNFR.069.008. In this new facility rule, EPA has not adopted a population-based approach to measuring performance. Instead, EPA has chosen a relatively objective and quick metric for evaluating performance, impingement and entrainment.

Comment ID 316bNFR.012.015

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The EPA recognizes that a 2 mgd threshold would still leave almost all of the cooling water flows subject to regulation - 99.97 percent in EPA's judgment (65 Fed. Reg. 49068). It should be obvious that, if exempting smaller sources has any legitimacy at all, as we (and apparently EPA) believe it does, a cutoff that removes only 0.03 percent of the intake water flows from the regulatory program is inadequate.

Nor is it relevant that the percentage excluded may be higher for new facilities - if a new facility has minimize its cooling water needs by dramatically reducing the amount of water it must withdraw compared to an existing facility, that is an indication that the new facility has already taken action to minimize adverse environmental impact, not an indication that such a small flow needs to be regulated.

The EPA believes that a 25 mgd cut-off would still leave more than 99 percent of cooling water flows subject to regulation. (The percentage would be even higher with the restriction we proposed above, that it not remove more than 10 percent of the 7Q10 stream flow.) This would certainly limit the rule to intake structures that warrant evaluation, while dramatically simplifying implementation of the rule and minimizing its impact on small businesses. This does not mean, though, that those manufacturing facilities' intake structures present a significant risk of adverse environmental impact. We believe that the vast majority, if not all, of those mills would be able to demonstrate no Adverse Environmental Impact.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the

burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD based in part on economic considerations. For further discussion of these points, see Sections V and VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.012.016

Author Name Unsigned

Organization National Association of Manufacturers

Subject Matter Code 125.83.1

Definition: 7Q10

The NAM suggests the following be added to the proposed definition of "cooling water:"

"If heated water is needed for a manufacturing process, use of waste heat to heat that process water does not make that process water "cooling water."

Without this clarification to the definition, or something like it, the 316(b) rules could have substantial adverse air-quality and energy impacts, without producing any substantial reduction in the amount of water withdrawn by such industrial facilities.

EPA Response

See 316bNFR.012.012.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Randy Meyer

On Behalf Of:

AMP-Ohio

Author ID Number:

316bNFR.013

Note

No comments were coded for this letter. The author fully supports the comments made by APPA (316bNFR.043)

Comment ID 316bNFR.013.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Randy Meyer

Organization AMP-Ohio

No comment was coded for this letter. The author supports the comments submitted by APPA (316bNFR.043).

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Steven C. Guyer, Robin S. Fortney &
James M. Riddle

On Behalf Of:

MidAmerican Energy Holdings Co.

Author ID Number:

316bNFR.014

Comment ID 316bNFR.014.001

Author Name	Steven C. Guyer, Robin S. Fortney & James M. Riddle
Organization	MidAmerican Energy Holdings Co.

Subject Matter Code MISC

Miscellaneous Comment

The goal of the CWIS proposal is to comply with the mandate of Section 316(b) of the Clean Water Act (CWA), which directs EPA to "require that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." The EPA has done a good, top-down review of the proposal, the critical elements of the rule and its enforcement, and sources and types of data and analytical techniques available for supporting investigations and decision-making pursuant to the proposal.

However, after top-down analysis, design must follow bottom-up implementation which addresses, appropriately and correctly, many details. While the details have, for the most part, been identified in the EPA's discussion, they could probably be addressed to a greater level of detail. The Company believes that the overall problem analysis (establishing a fair and equitable rule which complies with the requirements of Sec. 316 and the National Environmental Policy Act) is in part incomplete and in part inadequate. It doesn't yet seem to reach and to support the regulatory conclusions and language of the CWIS proposal. Encouragingly, though, with some additional attention to recent and ongoing scientific and engineering studies, and by incorporating such information into the same type of analysis that the EPA has already performed, an expanded understanding of the problem can be established. Then we would have a rule which correctly identifies the issues and concerns to be settled and the means by which they can be handled.

EPA Response

EPA agrees with the commenter that EPA has written a good top-down rule. With respect to the bottom-up analysis and implementation, EPA agrees that some additional guidance needs to be provided to the permit writers to ensure the rule is implemented properly. EPA intends to draft a permit writers guidance document after the final rule is released. EPA intends to incorporate recent and ongoing scientific and engineering studies in the guidance document to help permit writers implement the final New Facility Rule.

Comment ID 316bNFR.014.002

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

EPA Should Offer Alternatives to Meet the Intent of Section 316(b)

EPA has proposed an inflexible approach to the §316(b) rule. This approach is neither warranted nor scientifically supported.

MidAmerican Energy endorses an alternative developed by the Utility Water Activities Group (UWAG) and the Edison Electric Institute, both of which the Company is a member. This alternative proposes establishing a consistent process by which permit writers would implement §316(b) for a new cooling water intake structure (CWIS) on a site-specific basis. This process would use a tiered approach that first determines whether or not a proposed CWIS is likely to have an "adverse environmental impact" (AEI) to affected aquatic resources over the permit period. If so, the permit applicant and agency permit writer would determine what CWIS technologies are best, given associated benefits and costs. The applicant would have to conduct studies and collect data to assess the potential for AEI. EPA would provide guidance for this determination, including (1) what defines AEI and how it should be assessed, (2) what CWIS technologies are available and how they perform, (3) how to evaluate benefits and costs, and (4) what criteria should be used to select Best Technology Available (BTA), including what benefit/cost test should be applied.

The permittee should have the option of seeking an expedited §316(b) determination by selecting CWIS design factors identified by EPA to be highly protective of aquatic resources. These CWIS design factors may include wet closed-cycle cooling systems or a low design approach velocity. EPA should remain open to innovative technologies that develop in the future. The permittee would have the option of incorporating the identified technologies or design characteristics into its facility and/or CWIS and, in return, obtaining a determination that §316(b) is satisfied. An approach similar to the Clean Air Act (CAA) establishment of Best Available Control Technology (BACT) would be appropriate. For BACT, the Agency maintains a database of technologies which are considered, de facto, BACT. The discharger may select one of these or, under discharger's burden of demonstration, show a new approach to meet pre-established BACT criteria.

An expedited permitting alternative is important because market conditions continue to evolve; a deregulated energy industry will create a need for more flexibility. As EPA notes, many of the smaller, combined-cycle plants currently being proposed to meet critical energy needs across the country are designed to use closed-cycle cooling systems. While such designs may be technically and economically feasible for some proposed plants, they may not be feasible or desirable everywhere.

In some situations, a comprehensive consideration of site-specific issues, including air quality, water quality, solid waste disposal, community relations and aesthetic concerns may indicate that once-through cooling is a more attractive option. Such an indication would warrant detailed site-specific analysis and justification. The permittee may conclude that the expense of a site-specific demonstration to justify environmentally a new once-through cooling system is warranted, in, for

example, a minimum anticipated revenue situation, due to the higher costs, direct and indirect, internal and external, of a recirculating system. In either case, the permitting agency would gain additional, valuable biological monitoring information that would be useful for natural resource managers for this site and others.

Such an approach by the Agency, presenting an expedited process but allowing the applicant to study the situation to so great a depth as they desire, provides the utility with a choice: to incorporate EPA-approved technologies and performance standards, or to demonstrate that alternative technologies for cooling water intake structures can be managed to minimize adverse environmental impact, and in so doing establish a best use of available resources.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. EPA did not adopt commenter's screening procedure because such a screening level is difficult to establish on a national basis and it, in effect, allows certain impacts to continue unabated, which is not fully consistent with the objective of 316(b) to apply best technology to minimize adverse environmental impact.

Comment ID 316bNFR.014.003

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

A Site-specific Approach Is Needed

The Company prefers the use of site-specific analysis and consideration as compared to a nationwide paradigm as is proposed in the CWIS proposal. One size typically does not fit all, and those who can fit in it seem to be fitted poorly. Pursuant to NEPA, the public should not accept a poor fit when and if a tailored and quality product can be provided at no additional, or even less, cost.

A site-specific approach, one which takes into consideration the complexity of aquatic communities, local environment, appropriate technologies, impacts to other environmental media, and external and indirect, including social, costs is essential. For instance, the impact of EPA's proposed rule on utilities operating on the Missouri and Mississippi Rivers presents an incredibly over-zealous approach in light of the man-made changes to both of these rivers.

The Missouri River, in particular, has been so changed by the system of wing dams and reservoirs that it no longer supports the same fish and wildlife populations as existed before these flood control structures were installed. The river moves so fast in most places along the western Iowa border that the littoral zone does not support aquatic plant life. The U. S. Fish and Wildlife Service states,

The operation of the System dams has altered the natural streamflow of the Missouri River thus altering the habitat of native riverine fish species as well as that of other flora and fauna. Currently, the Missouri River…has been modified significantly with approximately 36 percent of the riverine habitat inundated by reservoirs, 40 percent channelized, and the remaining 24 percent altered due to dam operations. Most of the major tributaries of the Missouri and Mississippi Rivers have also been altered to various degrees by dams, water depletions, channelization and riparian corridor modifications. <FN 3>

Each site where a cooling water intake structure may be placed is different. Flow, substrate and shoreline characteristics vary greatly from site to site. The Electric Power Research Institute has described the various technologies for fish protection and their usefulness at different facilities. <FN 4> EPA recognized the site-specific features that affect §316(b) decisions in its 1976 §316(b) rule, its 1977 draft guidance for implementing §316(b), and many §316(b) case decisions, including those for MidAmerican Energy facilities.

Footnotes

3 "Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System," revised draft dated August 21, 2000, pages 58 and 148, prepared by the U. S. Fish and Wildlife Service.

4 See Electric Power Research Institute, Fish Protection at Cooling Water Intakes (EPRI Technology Review), TR-114013 (December 1999), pages 2-21 and 2-22.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

The two-track approach would allow BTA to be established on a site-specific basis and would also allow the specific characteristics of the Missouri River to considered in the permitting process.

Comment ID 316bNFR.014.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

A Resource Management Approach Is Needed

Another consideration is the comparison and contrast of preservation vs. management of natural resources. Beyond a mere point of definition, there is a fundamental relationship both to the Clean Water Act (CWA) and the National Environmental Policy Act (NEPA) contained in this issue. It begs a determination, at least for purposes of the CWIS proposal, as to how appropriate stewardship of natural resources addresses preservation.

Congress has endorsed a fisheries management approach in a series of statutes, such as the Magnuson-Stevens Fishery Conservation and Management Act in 1976 (amended in 1986) and again in 1996 as the Sustainable Fisheries Act, administered by the National Marine Fisheries Service. In over 25 years of §316(b) research, the science of fish population dynamics has continued to provide information about how fish populations maintain themselves and interact with other populations. Fisheries managers use this information to assess fish stocks.

For example, Quad Cities Nuclear Power Station, of which MidAmerican Energy is part owner, has maintained fish populations in Pool 14 of the Mississippi River station since 1971. One of the principal objectives of the program is to determine species composition and relative species abundance in the various habitat types that occur in Pool 14. As summarized in the 1996 annual report of this program:

Studies to identify and quantify potential impacts of Station operation on the biota of Pool 14 were initiated in 1971. To date, the program includes one year of pre-operational and 25 years of operational investigations. The earliest studies considered a wide range of potential biological effects. Many of the initial concerns have been resolved and recent efforts have focused on the well-being of the fish populations in Pool 14. Recent studies (1978-1995) were developed in cooperation with the Iowa and Illinois Departments of Natural Resources and the Illinois Environmental Protection Agency. The emphasis on fish reflects the continued belief that if any long-term impacts should occur, this component of the biota is most likely to exhibit detectable changes. Further, the emphasis recognizes the importance of the local commercial fishery. <FN 5>

Fisheries are a renewable resource, and managers have realized that there are natural mechanisms that compensate for losses to fish populations. Long-term fish surveys demonstrate compensation in a variety of fish species. It is reasonable and logical that EPA acknowledges the importance of compensation as rules are established for fish species susceptible to impingement and entrainment.

Footnotes

5 Lawler, Matusky & Skelly Engineers, LLP, for Commonwealth Edison Company, Quad Cities Aquatic Program 1996 Annual Report, February, 1997, pp. 4-5.

EPA Response

Although EPA agrees that fishery management practices have been in place for over 20 years, EPA remains concerned over the lack of data for many fish species and the acknowledged uncertainty associated with fishery management models. As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Comment ID 316bNFR.014.005

Subject Matter Code	MISC
	Miscellaneous Comment

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

The CWIS proposal repeatedly uses a number of terms without offering a concise or precise definition of their meaning. These aren't necessarily terms which have a common meaning in the scientific and engineering communities. The Company wishes to address the efficacy of using terms without providing a standard definition, and also we wish, therefore, to offer suggested definitions for some terms.

Efficacy of using standard defined terms.

Scientists and engineers deal with propositions and proofs based on fact and logic. The conclusions must come about from considering certain fundamental truths and definitions. These truths hold, as physical and chemical fact, regardless of societal philosophy and preference.

While the role of fundamental truth and definition is no less important and no less critical in a legal and political venue, our post-humanist and post-modernist society slants and colors the nature of basic political and legal points and allows these to be argued and adapted with respect to societal needs and temporal goals. The needs of the profession give rise to commonly understood but softly defined concepts, rather than absolute scientific fact. On Federal Register (FR) pages 49074-49075, the Agency invites comment, specifically regarding definition of "adverse environmental impact," by asking whether its definition should be more broadly or more narrowly constructed.

The implication that a definition could be broadened or narrowed is against the principles of science. Definitions are necessarily established in science to allow research and application to proceed. It is, therefore, paramount that the Agency state how these terms are defined and to leave them alone once so defined so that the playing field will be level.

EPA Response

EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today's rulemaking for new facilities, EPA does not define, but interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function

(see preamble section VI.B.2.a.).

Comment ID 316bNFR.014.006

Subject Matter Code	18.1
Elimination of "Wholly Disproportionate" Cost Test	

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Organization MidAmerican Energy Holdings Co.

"Wholly disproportionate" and "disproportionate percentage"

These phrases convey concepts that are useful in discussing overall approach and consideration of a proposal, particularly from a top management level. A scientist or engineer talks of proportions and uses ratios in calculations, for example, in gas temperatures and pressures and chemical equation stoichiometry. Science, though, does not make absolute decisions and determinations based on proportions alone.

Engineering decisions are generally based on calculating a parameter, like the stress in a beam, and comparing it to a scale, like the strength of steel, to see if it will or will not work. The result is binary – yes or no – and not a proportion. The intuitive phrase "disproportionate percentage" has the same scientific or engineering value as the "law of averages." As a professional gambler will tell you, there is no law of averages, only any number of people lining up at the table who believe in the law of averages and are willing to hand over their money. The gambler, as the scientist and engineer, deals with absolutes. They may be probabilities, but they are discrete values. There is no scientifically meaningful or helpful way to define "disproportionate percentage." But, the concept that one project may in some proportion be more attractive than another is useful for discussion, as long as any formal rule respects that proportions should not be used, of themselves, to reach scientific and site-specific conclusions.

EPA Response

EPA has considered the comment and has adopted the cost to revenue test for determining economic practicability. For more detail please see response to comment 316bNFR.206.014 in comment category 10.11 and the preamble to the final rule.

Comment ID 316bNFR.014.007

Subject Matter Code	10.04
Site-specific Permit Flexibility	

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"Average industry costs"

The preamble of the CWIS proposal itself states that

The specific compliance response of each facility would be highly site-specific <FN 6>

but the discussion limits analysis to include only a set of common compliance strategies including

widening the intake structure or installing a velocity cap or passive screens to reduce velocity; switching to a recirculating system to reduce intake flow; and implementing additional technologies to reduce impingement and entrainment <FN 7>

These do not seem to represent, in an engineering sense, a comprehensive investigation to determine best technology available as called for in the proposal and the CWA. <FN 8,9> In fact, a scientific and engineering determination of best technology available does, under the definition of engineering, require a site-specific analysis of benefits and costs rather than any use of average industry costs. We suggest that those common compliance strategies either be identified as suggestions or be established as de facto conditions of compliance; further, the permittee should be allowed to propose less-stringent requirements as justifiable through site-specific analysis.

Footnotes

6 65 FR No. 155, Thursday, August 10, 2000, p. 49101.

7 Ibid.

8 Ibid., p. 49060.

9 Sec. 316 [33 USC 1326] Thermal Discharges

EPA Response

In costing this rule making, EPA made conservative assumptions about how facilities might comply with requirements. EPA applied the same conservative assumptions to each of the expected new facilities. Assumptions were made because the facilities are planned and have not yet been built. EPA collected as much data as was available, based on the NewGen database, the survey information, and cost estimates from vendors. EPA believes the assumptions that were made for compliance costs were representative and therefore reasonable.

EPA has identified the compliance options as assumptions used for costing purposes only. There is nothing in the rule that would preclude a facility from evaluating other technologies that may be less expensive, as long as they meet the requirements.

Comment ID 316bNFR.014.008

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

"Adverse environmental impact"

This term, adverse environmental impact, is perhaps the most critical definition and must be either agreed upon or regulatorily asserted before industry can respond to or comply with the CWIS proposal. The Agency proposes several alternatives to define adverse environmental impact in the proposal <FN 10> and solicits comments as to which is the most appropriate or an offering of a better definition. The proposed definition is:

A level of impingement or entrainment of aquatic organisms that is recurring and nontrivial <FN 11>

which is then further defined as

the impingement or entrainment of one (1) percent or more of the aquatic organisms from the area around the cooling water intake structure from which organisms are drawn onto screens or other barriers at the entrance to a cooling water intake structure or into the cooling system, as determined in the Source Water Baseline Biological Characterization. <FN 12>

The use of the word "nontrivial" is somewhat complicating and, again, not particularly helpful. It is not a word that has specific scientific meaning but is, again, a relative concept. Establishing, then, 1% seems arbitrary and is not backed up with scientific evidence to conclude, with scientific certainty, that 1% is or is not trivial. There is no evidence offered to determine that there is impact, that it is significant, or that it is adverse.

Footnotes

10 65 FR No. 155, Thursday, August 10, 2000,p. 49073-49075.

11 Ibid. p 49074.

12 Ibid. p 49074.

EPA Response

Please see response to comment 316bNFR536.013.

Comment ID 316bNFR.014.009

Subject Matter Code	9.4
Adverse Environmental Impact	

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First Determine Whether an Intake Will Cause "Adverse Environmental Impact" (AEI)

The statutory language of §316(b) offers the following steps in the decision process:

1) Will there be adverse environmental impact?
2) What technologies are available?
3) Which of them is best for the site?

Therefore, the §316(b) rule should require that a permit applicant and regulatory agency

(1) determine whether a proposed cooling water intake structure will have an adverse impact,
(2) if so, select the CWIS and/or facility choices for location, design, construction or capacity that minimizes the adverse impact, and
(3) decide which of these alternatives will be best based on cost and effectiveness.

This decision process must start with a scientifically supportable definition of AEI.

EPA Response

EPA disagrees with the statutory interpretation provided by the commenter that AEI assessments using a population or ecosystem endpoint must be defined prior to installing intake technology. However, EPA believes that the two-track technology-based framework described in today's rule does allow new facilities to incorporate some of the concepts as indicated by the commenter. EPA believes that minimizing impingement and entrainment in the manner required under Track I is appropriate for new facilities because the record demonstrates that new facilities are overwhelmingly able to meet these requirements and EPA is seeking an objective, relatively quick standard for permitting new facilities. Under today's rule facilities may choose to implement Track I performance-based standards or conduct site-specific biological monitoring under Track II to show comparable minimization of entrainment and impingement mortality.

Comment ID 316bNFR.014.010

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

"Adverse Environmental Impact" Must Be Defined

EPA has short-circuited the §316(b) decision-making process by deciding what actions and situations will minimize adverse environmental impact (AEI), but does not define what AEI is. Basically, EPA has determined that if the intake is outside the littoral zone and flow and velocity are below defined values, AEI is minimized. While EPA offers six alternative definitions (including "one fish equals AEI"), the Agency does not offer scientific support for these alternatives. <FN 21> We believe that a sound definition is a necessary first step in the rulemaking process.

EPA has ignored the perspective offered in its preamble to the original §316(b) regulations:

The statute directs the Agency to insure that enumerated aspects of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts. Once such adverse effects have been identified (or predicted, in the case of proposed facilities) then the effort must be to select the most effective means of minimizing…those adverse effects. <FN 22>

EPA's §316(b) Development Document also acknowledges that the first step in §316(b) analysis is to identify whether there is adverse environmental impact [italics added for emphasis]:

If a significant adverse environmental impact is identified, the applicant should be required to develop a recommended plan of action to minimize the impact with alternatives along with estimates of the results anticipated. It is useful to note that the statute and the regulations require only that adverse environmental impacts be minimized and not necessarily eliminated altogether. <FN 23>

The CWIS siting considerations and assumptions, regarding location with respect to shore and productive regions of waterbodies, seem also to be thoroughly based yet incomplete. Again, by considering further details, and ensuring that site-specific considerations will be addressed, the Company believes that more appropriate conclusions regarding the intake-siting can be realized.

Footnotes

21 65 Fed. Reg. 49074-75

22 41 Fed. Reg. 17387 and 17388 (April 26, 1976) (emphasis added)

23 Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact, EPA April 1976, Appendix B, p. 222 (emphasis added).

EPA Response

Please see responses to comments 316bNFR.516.020 (interpretation of AEI), 316bNFR.014.009 (two-track framework), and 316bNFR.508.017 (sensitive or non-sensitive waterbody types).

Comment ID 316bNFR.014.011

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

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"Impact" in AEI Means at the Population Level

As noted above, statutory language and EPA's earlier guidance do not support the "one fish equals AEI" proposition. AEI must be defined in terms of effects to the aquatic community as a whole, and not its individual members. Assessing the risk to a population is standard practice in guiding the development of both water quality and drinking water standards. Even the Endangered Species Act allows the U.S. Fish and Wildlife Service to permit the incidental taking of individuals.

It does not appear to be Congress' intent to apply a "no risk" standard to cropping caused by a CWIS as compared to other sources of fish mortality. Standard natural resource management programs regulate and encourage the harvest of fish and other aquatic organisms.

EPA Response

Please see response to comment 316bNFR.507.004 and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.014.012

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

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We Support UWAG's Proposed Definition of AEI and Screening Method

The AEI definition recommended by UWAG in its comments to the proposed §316(b) rules would allow site-specific §316(b) decisions while ensuring a uniform process for determining AEI. MidAmerican Energy supports the following definition of "adverse environmental impact" as proposed by UWAG:

Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, and (2) is attributable to the operation of the cooling water intake structure.

This definition is supported by scientific principles used in natural resource management. The concept of "maximum sustainable yield" as developed in the Magnuson-Stevens Fishery Conservation and Management Act is central to modern fisheries management. Fisheries scientists have developed a variety of methods for estimating (1) the level of mortality that can be imposed on a fish population without threatening its capacity to provide maximum sustainable yield on a long-term continuing basis and (2) the optimum population size for maintaining the maximum sustainable yield for particular communities.

Entrainment and impingement are forms of harvesting not unlike fishing, so methods developed by fisheries scientists to evaluation proposed fishing regimes can be used to evaluate potential impacts of a CWIS. The Electric Power Research Institute reviews these predictive methods in its Catalog of Assessment Methods for Evaluating the Effects of Power Plant Operations on Aquatic Communities. <FN 24>

Footnotes

24 EPRI Assessment Methods Catalog, TR-112013, June 1999.

EPA Response

Please see responses to comments 316bNFR.510.006, 316bNFR.068.037, and preamble section VI.B.2. for further discussions of AEI under today's rule.

Comment ID 316bNFR.014.013

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

Minimizing adverse environmental impact

Given a definition of adverse environmental impact which includes both decreased value of the environment and failure to attain widest beneficial use, and then reconsidering the word of the CWA, requiring best technology available, gives insight into an appropriate understanding of minimizing adverse environmental impact (MAEI). MAEI can only be realized on a site-specific, case-by-case basis when the overall needs of the population, the goals and objectives of the operator, and the character and quality of the environment are uniquely described and analyzed. The CWA requires "best technology available" to be used. Following the language defining Best Available Control Technology (BACT) in the Clean Air Act,<FN 26>

the degree of emissions reduction that the Administrator determines, on the basis of technological and economic feasibility, health, environmental and energy impacts, is achievable through the application of the most effective equipment, measures, processes methods, systems or techniques …

perhaps then MAEI should be defined as: resolving location, design, construction and capacity to achieve least decrease in net future value and widest range of beneficial use of the environment.

Footnotes

26 42 U.S.C. 74010976261, July 14, 1955; 69 Stat. 322, as amended

EPA Response

EPA disagrees that minimization of AEI can only be achieved on a site-specific basis (see response to comment 316bNFR.014.009). However, EPA believes that the two-track technology-based framework described in today's rule does provide new facilities with the flexibility to minimize AEI through performance-based standards (Track I) or based on comparable performance at a particular site (Track II). In the case of many new facilities, AEI may be presumed in advance and the Track I performance-based standards option can be selected. Under today's rule, a facility can choose the Track II option and show through biological monitoring that comparable entrainment and impingement minimization will be achieved. Thus, under today's rule facilities may choose to implement Track I performance based standards or conduct site-specific biological monitoring under Track II to show comparable minimization of entrainment and impingement.

Comment ID 316bNFR.014.014

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

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BTA Decision Should Include a Cost/Benefit Determination

Once AEI has been defined and is determined likely to occur at a given site, then the permitting agency should consider what CWIS technology, or array of technologies, is the "best available" for that site. EPA should use the site-specific AEI assessment information prepared by the permittee to understand what and how Representative Indicator Species are affected.

EPA has proposed nationwide flow volume and velocity restrictions without regard for local biological information. It is far more responsible to look at site-specific conditions and facility design to determine BTA. Even though this is a complex undertaking, utilities have conducted these studies and reviews since the 1970s.

We suggest the following basic framework for selecting BTA:

4) In consultation with the permitting agency, the permittee should use information on Representative Indicator Species (RIS) to identify those demonstrated, commercially available CWIS technologies that are likely to appreciably reduce the affects of the CWIS on the RISs.

5) The permittee should eliminate any of the candidate technologies that are not appropriate for the facility because of siting or operational constraints.

6) The permit writer and permittee should evaluate the performance and cost of each remaining technology.

Where agency and permittee agree on the technology or suite of technologies that would clearly minimize AEI to the representative species and the permittee agrees that the cost makes these technologies available, then the selected technology would be BTA. If the agency and permittee do not agree, the permittee could prepare a benefit/cost analysis to identify the option that is "best available" from both a cost and environment perspective.

MidAmerican Energy believes that a best available intake technology must have costs that are reasonably proportional to its benefits. The option that satisfies this requirement would be BTA.

EPA Response

EPA discusses the role of cost in this rule in 316bNFR.206.014. The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track

I through other means under Track II. See response to 316bNFR.008.001. Under this approach, a new facility can assess the cost of compliance under Track I versus Track II, and also seek to optimize efficiency if it seeks to comply under Track II. Thus, the final rule allows for the consideration of costs in assessing compliance options. However, performance under Track II remains linked to the technology-based performance requirements established under Track I, not a site-specific cost/benefit analysis, which would be far too complex and inconsistent with the mandate of 316(b). EPA has considered costs in developing the rule and has found the requirements to be available and economically practicable. The rule also allows a new facility to request alternative requirements when compliance would result in costs that are wholly out of proportion to those considered by EPA in establishing the requirement at issue.

Comment ID 316bNFR.014.015

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

EPA's Assumptions That Widespread AEI Is Occurring Are Incorrect

In the preamble to the proposed rule, EPA uses several examples to show that impingement and entrainment is a severe nationwide problem what needs to be addressed. <FN 27> The Company has attempted to show in previous discussion that EPA's presentation of the problem is flawed, i.e., the taking of aquatic organisms is not necessarily the same as adverse environmental impact.

To provide a local illustration of this point, we offer the results of a long-term aquatic ecology study conducted for MidAmerican Energy's Neal Station complex. Morningside College conducted a long-term study on the operational effects of George Neal Units 1-4, located on the Missouri River near Sioux City, Iowa. The abstract from the Missouri River Aquatic Ecology Studies, Ten Year Summary (1972-1982), Rod Tondreau, Jane Hey, and Dr. Edward Shane, Morningside College, is included here:

A ten year study of the channelized Missouri River near Sioux City and the operational effects of the George Neal generating units 1-4 are summarized in this report. During this period (1972-1982) degradation of the river channel caused by channelization and above normal flow rates has resulted in the loss of much of the highly productive off-channel aquatic habitat - a loss that has severely impacted most river life forms. Water quality during the period was influenced by run-off form snowmelt and rainfall and by input from non-point source discharges in the Sioux City area. No affect from station operation was observed on any of the chemical and physical parameters measured during the study. Plankton populations were characterized by low numbers and diversity. Diatoms were the dominant group. Macroinvertebrates have become established on the rock rip-rap shoreline areas with channelization nearly eliminating the benthic (bottom-dwelling) forms. Numbers were consistently greater in the plant outflow areas. Of 52 fish species collected in the study area, only eight species (carp, carpsucker, gizzard shad, goldeye, shorthead redhorse, buffalo, channel catfish and flathead catfish) are present in significant numbers. Most other species have been unable to adapt to the harsh conditions resulting from channelization. Fish are attracted to the plant outflows especially when river temperatures are colder. No adverse effects to the fish from this attraction have been observed. Fish impingement and entrainment by the plant intake structures was found to be minimal due to the low numbers of organisms affected. Thermal studies on the discharges from both plants found minimal areas of elevated temperatures which remain close to the shoreline allowing a substantial zone of passage for fish moving upstream. Some of the cooling water has been diverted into nearby oxbow lakes whose level and surface area have declined considerably due to channelization and degradation. This project has improved the condition of these oxbows with no adverse affects on water quality and aquatic life.

In another illustration, a long-term monitoring program is being conducted for the Quad Cities Nuclear Power Station, owned in part by MidAmerican Energy. QCNPS is located in Pool 14 of the Mississippi River and uses a once-through cooling water system. The purpose of the program is to determine whether station operations are having any measurable effect on the fishery of the pool.

The impingement monitoring study, begun in 1973, documents species composition and numbers of fish impinged. According to the 1996 annual report for the long-term monitoring program states, "Data collected during the course of these studies indicate that a large percentage of the fish impinged are already moribund or dead prior to their entrance in to the intake forebay." <FN 28>

The Quad Cities Nuclear Power Station long-term fisheries monitoring program has documented the continued presence of a diverse warm water fish population since 1971. It is apparent that, while impingement occurs, it is not adversely impacting the area fishery. Indeed, these continuing diverse populations of fish are not consistent with EPA's notion that AEI is widespread and rigid minimum standards must be imposed to mitigate the problem.

Footnotes

27 65 Fed. Reg. 49073

28 Quad Cities Aquatic Program 1996 Annual Report, Volume 1, Lawler, Matusky & Skelly Engineers LLP, February 1997.

EPA Response

EPA disputes the commenters assertion that widespread adverse environmental impact is not occurring. EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. EPA does not believe that low impingement and entrainment numbers observed in a highly disturbed habitat is relevant to the impacts typically associated with cooling water intakes.

In the case of the George Neal Station located on the Missouri River near Sioux City, Iowa, the study provided states that during the study period of 1972-1982 "degradation of the river channel caused by channelization and above normal flow rates has resulted in the loss of much of the highly productive off-channel aquatic habitat-- a loss that has severely impacted most river life forms." As stated in response to comment 316bNFR.501.015, EPA questions the relevance of low numbers of entrainment or impingement losses within waterbodies that are degraded at the time the study was conducted. In the case of a waterbody or waterbody segment that is impaired, living resources often exhibit diminished numbers and diversity. The limited community in the vicinity of this intake, consisting of only eight species in significant numbers, does not, in EPA's opinion, represent a healthy aquatic community nor does it represent other waters where there is a far richer and more diverse aquatic community.

EPA's water program efforts, including the development of water quality standards, are designed to maintain and restore the Nation's waters (see Section 101(a) of the Clean Water Act). Under these programs, it is EPA's mission to restore even highly degraded waterbodies such as the one cited by the commenter in a manner that will result in increased numbers of fish and other aquatic resources as the waterbody returns to more historical, pristine conditions. Moreover, EPA rejects the argument that it is appropriate to further impact a waterbody once it has been degraded.

With respect to the comment that many impinged fish are already dead or moribund, EPA does not believe that this is the case for many of the facilities experiencing substantial impingement events nor does this address the impacts associated with entrainment. Finally, today's rule making is directed toward new facilities, not existing ones such as the Neal plant. Existing facilities will be addressed in a

future rule making.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.014.016

Subject Matter Code	MISC
	Miscellaneous Comment

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

Appropriate Protection of Threatened and Endangered Species Is Already Occurring

EPA states that it is "concerned about the potential impacts of cooling water intake structures located in or near habitat areas that support threatened or endangered species." Fed. Reg. 49072, column 3. If impingement and entrainment threaten the existence or the recovery of any species listed as threatened or endangered under the Endangered Species Act (ESA) (16 U.S.C. §1531 et. Seq.), action would be required under the ESA.

MidAmerican Energy is concerned about concurrent and competing jurisdictions that may occur if EPA attempts to regulate threatened and endangered species or their habitats. The U.S. Fish and Wildlife Service administers the Endangered Species Act, with some local administration by state agencies. In many instances, the Fish and Wildlife Service has developed species-specific recovery plans meant to assure that regional and local effects are minimized to enhance species recovery.

The Company has consulted recently with the U. S. Fish and Wildlife Service on two new facility projects where threatened and endangered species (primarily Higginseye Pearly Mussel and Pallid Sturgeon) are known or believed to occur. In both cases, the Fish and Wildlife Service has developed recovery plans that affect the siting and/or design of intake and outfall structures. In the case of the Pallid Sturgeon, the recovery plan seeks to "ensure water intakes and diversions are not adversely affecting pallid sturgeon populations;" additionally, in the case of the Pallid Sturgeon, the U. S. Fish and Wildlife Service does not focus on just electric utility cooling water intake structures, but also "new point-source water intakes serving industry, irrigation, and public water supply." <FN 29>

Since threatened and endangered species come under the purview of the ESA, we do not believe that the §316(b) regulations need to include additional entrainment and impingement controls.

Footnotes

29 Recovery Plan for the Pallid Sturgeon (Scaphirhynchus albus), Department of the Interior, U. S. Fish and Wildlife Service, 1993.

EPA Response

EPA disagrees that the section 316(b) New Facility Rule will create concurrent and competing jurisdictions, concerning endangered or threatened species. EPA's NPDES permitting regulations at 40 CFR 122.49 contain a list of Federal laws that might apply to federally issued NPDES permits. The Endangered Species Act, 16 U.S.C. 1531 et seq is one of the Federal laws included in this list. Nothing in this final rulemaking authorizes activities that are not in compliance with these or other applicable Federal laws.

For purposes of implementing section 316(b) in the new facility rule, EPA thinks it is reasonable to interpret the phrase adverse environmental impacts as including a range of impacts, including

impingement and entrainment, diminishment of compensatory reserve, stresses to the population or ecosystem, harm to threatened or endangered species, impairment of state water quality standards. EPA requires the facility to select and install design and construction technologies to reduce impingement mortality and entrainment if there exists undesirable accumulative effects from multiple intakes on the same water body, or the presence of regional important, threatened, or endangered species. In addition, EPA encourages the Director to coordinate a review of the list of threatened or endangered species with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service staff to ensure that potential impacts to threatened or endangered species have been addressed.

Comment ID 316bNFR.014.017

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

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Using the "Littoral Zone" to Define "Sensitive Areas" Is An Oversimplification

EPA is proposing to require expansive BTA requirements for different types of waterbodies (tidal rivers, estuaries, and the "littoral zone" of freshwater rivers, lakes and reservoirs). EPA discusses the importance of location of the CWIS with respect to the littoral zone at 65 Fed. Reg. 49083-85. EPA defines the littoral zone at proposed §125.83, 65 Fed. Reg. 49116, columns 2-3, as:

Littoral zone means any nearshore area in a freshwater river or stream, lake or reservoir, or estuary or tidal river extending from the level of highest seasonal water to the deepest point at which submerged aquatic vegetation can be sustained (i.e., the photic zone extending from shore to the substrate receiving one (1) percent of incident light); where there is a significant change in slope that results in changes to habitat and/or community structure; and where there is a significant change in the composition of the substrate (e.g., cobble to sand, sand to mud). In oceans, the littoral zone encompasses the photic zone of the neritic region. The photic zone is that part of the water that receives sufficient sunlight for plants to be able to photosynthesize. The neritic region is the shallow water or nearshore zone over the continental shelf.

EPA proposes to use the littoral zone as a proxy for sensitive biological areas. However, simplification does not adequately take into account the various biological, hydrological and physical features of a site that should be taken into account when siting and designing a CWIS. EPA acknowledges in the preamble at 65 Fed. Reg. 49083, column 3, that "(t)he optimal design requirement for location is to place the inlet of the cooling water intake structure in an area of the source water body where impingement and entrainment effects on organisms are minimized (taking into account the location of the shoreline, the depth of the water body, and the presence and quantity of aquatic organisms or sensitive habitat)."

EPA recognizes that locating CWIS away from sensitive areas is not always possible, and that "cooling water intake structures at new facilities located inside these sensitive areas would generally require controls to minimize adverse environmental impact."<FN 30>

EPA provides no scientific basis for evidence that all littoral zones must be protected from the effects of a CWIS. In fact, the littoral zone of some rivers, such as the Missouri River on which MidAmerican Energy operates five cooling water intake structures between Sioux City and Council Bluffs, Iowa, is highly impacted by the effects of manmade structures and operating regimes. The river flows so fast that aquatic vegetation can exist in very few locations. The U.S. Fish and Wildlife Service describes these effects on the Missouri River as follows:

In general, the effects of past and present construction projects and flow alterations on Missouri River habitats in particular are summarized as follows:

*Construction of main stem dams and reservoirs has converted riverine and floodplain aquatic and wetland habitats to deep water habitats.

*Construction of dams has interrupted sediment and organic material transport, resulting in reduced turbidity, increased bed degradation, and reduced sandbar formation.

*Channelization, construction of river training structures, and bank stabilization of free-flowing reaches of the lower river for commercial navigation has resulted in the loss of over 100 miles of river shoreline, loss of shallow-water habitat, sandbars, oxbows and backwaters, and has contributed to bed degradation in some reaches.

*Construction and repair of floodplain levees in the lower river has led to the clearing and loss of floodplain forests and wetlands, isolated remaining wetlands from the river, and reduced organic matter inputs.

*Construction of dams has blocked upstream and downstream fish movements to spawning or foraging areas and/or adversely affected larval survival.

*Bottom releases from some dams has resulted in unsuitable temperatures for native warmwater fish spawning and development.

*Suppression of spring flows has caused: (1) loss of spawning cues (i.e., warm water coupled with river stage increases) which triggered spawning activity in native river fish, (2) loss of productivity in upper river reaches due to altered nutrient transport and cycling, …(3) lack of seasonal fish and wildlife access to remaining off-channel backwaters and wetlands….

*River bed degradation in the tailwaters below dams has compounded the effects of the loss of high spring flows for recharging wetlands and other off-channel habitats.

*Reduced formation of high elevation sandbar habitat in unchannelized reaches below dams, and vegetation encroachment of remaining high elevation bars has resulted from loss of sediment and scouring or flushing associated with the natural spring flood pulse. <FN 31>

The littoral zone of large expanses of the lower Missouri River does not support rooted plant production or fish production and is not reflected in the definition that EPA proposes. This example shows that EPA cannot simply assume that all littoral zones are places where fish are abundant and vulnerable to impingement and entrainment. A site-specific assessment could be more protective and less wasteful of resources because additional factors may be relevant to CWIS effects.

In its proposed definition of littoral zone, EPA recognizes that aquatic submerged vegetation is a primary factor affecting the presence of aquatic organisms. We agree with this approach and believe that this focus on aquatic vegetation is more scientifically valid than the percentage of light penetration, though light penetration is important. We suggest a more appropriate definition of littoral zone as follows

Littoral zone means any nearshore area in a freshwater river or stream, lake or reservoir, or estuary

or tidal river, extending from the level of highest seasonal water to the deepest point at which submerged aquatic vegetation is sustained.

Footnotes

30 Fed. Reg. 49083, column 3

31 See the "Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System," revised draft dated August 21, 2000, pages 168-169, prepared by the U. S. Fish and Wildlife Service.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.014.018

Subject Matter Code	10.021
Request for Comment: Intake Velocity Limitation	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

The Velocity Guideline of 0.5 fps May Not Be Appropriate For Every CWIS

From an engineering and scientific perspective, the detailed breakdown of cooling water flow volume and velocity considerations and assumptions which the Agency presents in the preamble to the CWIS proposal represent a comprehensive starting point but an incomplete analysis. By considering further details, and ensuring that site-specific considerations will be addressed, the Company believes that more appropriate conclusions regarding actual flow effects on entrainment and impingement can be achieved.

EPA states that "the velocity of water entering a cooling water intake structure exerts a direct physical force against which fish and other organisms must act to avoid impingement and entrainment." EPA believes that through-screen velocity should be controlled as it is one of the more important factors impacting adverse environmental impact at cooling water intake structures.<FN 32> §316(b) studies conducted earlier of MidAmerican Energy's cooling water intakes show that through-screen velocity at existing facilities is higher than the 0.5 fps restriction and that impingement does occur, but that impact to area fisheries is minimal. Two examples are described below.

MidAmerican Energy's Riverside Generating Station, located in Bettendorf, Iowa, has a through-screen velocity of 2.83 fps. The §316(b) study conducted for the intake structures at Riverside Station shows that affects of impingement on the area fishery are believed to be minimal:

For the entire study period, 47,003 fish were impinged at the new screen house while 7,699 fish were captured by the old screen house. Of the 54,682 fish collected, 92% were forage fish such as gizzard shad and freshwater drum. The remaining 8% were composed of game fish such as channel cat fish, bass and crappie. Despite the sizeable number of impinged fish, if the study's extensiveness is considered coupled with the variety of species captured, the overall impact from an impingement viewpoint is minimal.
<FN 33>

Similarly, the maximum through-screen velocity for the Neal stations, located on the Missouri River near Sioux City, Iowa, is 2.44 fps for Units 1-2 intake, 3.59 fps for Unit 3 and 1.61 fps for Unit 4. §316(b) study results show:

Impingement rates were low for all three intake structures although the rate at Neal Unit 4 (8.6 fish per hour) [11,575 total fish collected during the 18 month study] was greater than at the two other intakes. Most of the impinged fish at all three intakes were of small size (less than 15 cm). Mortality rates were similar at intakes for Unit 1-2 and Unit 3…but were greater at the Unit 4 intake…Species composition of impinged fish was similar at all intakes. Of the five most frequently impinged fish at each intake, four species (gizzard shad, freshwater drum, river carpsucker and channel catfish) were common to all three studies. <FN 34>

The study also indicates that the most abundantly impinged fish species are non-game or forage fish that are quite prolific and likely able to compensate for high mortality rates caused by impingement.

In addition, the rivers on which cooling water intakes exist can flow at speeds exceeding 0.5 fps. For example, as noted earlier, the Missouri River has an average velocity of 4.3 fps, which creates a less than hospitable riverine habitat for many young fish. The concluding discussion on impingement/entrainment in the Missouri River Aquatic Ecology Studies states:

Open cycle cooling appears to have a minimal effect upon the biota of the channelized Missouri River. Locating the intake structures along the main channel border avoids the more productive quiet water habitat used by fish as spawning and feeding areas.

These studies show that through-screen velocity has a small impact on area fisheries, but the impact on the fishery population is minimal.

Footnotes

32 Fed. Reg. 49087, column 3.

33 Riverside Generating Station, Environmental Assessment of Intake Structures, April 7, 1976.

34 Missouri River Aquatic Ecology Studies, Ten Year Summary (1972-1982).

EPA Response

Given the compilation of supporting data presented in the proposed rule, the NODA, and other information in the record of this rulemaking, the final rule retains the Track I intake velocity requirement of 0.5 ft/s through-screen velocity which EPA proposed. The 0.5 ft/s through-screen requirement is well supported by existing literature on fish swim speeds and is also appropriately protective, as the data suggest that a 0.5 ft/s intake velocity would protect 96 percent of the tested fish. EPA has concluded that such a requirement that protects almost all fish and life stages is particularly appropriate because it provides a margin of safety for circumstances in which, as is common, screens become occluded by debris during the operation of a facility and velocity increases through the portions of a screen that remain open. EPA notes that more than 70 percent of the manufacturing facilities and 60 percent of the electricity generating facilities built in the past 15 years have met this requirement and believes the requirement is an appropriate component of best technology available for minimizing adverse environmental impact at new facilities.

Additionally, EPRI's Technical Evaluation of the Utility of Intake Velocity as an Indicator of Potential Adverse Environmental Impact under Clean Water Act Section 316(b) stresses the important relationship between intake velocity and injury to aquatic life when it states stating that "[t]here is a substantial literature of laboratory and field data that points to increased impingement with increased intake velocities." The report also recommends that 0.5 ft/s be adopted on a national scale as a "screening value for the regulatory purposes of suggesting low potential adverse environmental impact." EPA's own research confirms both statements.

As evidenced by the data collected for the NODA and other material in the record of this rulemaking, the 0.5 ft/s requirement is scientifically based, is protective of aquatic resources with a reasonable

margin of safety, and is technically available and economically practicable (as demonstrated by the fact that it is frequently achieved at recently built facilities). As such, EPA has concluded that it is an appropriate component of best technology available for minimizing adverse environmental impact at new facilities.

EPA would emphasize that the final rule provides an alternative to the Track I requirement. If the permit applicant does not want to meet the specific Track I velocity requirement, the applicant can, under Track II, conduct site-specific studies and seek to demonstrate comparable performance through other means, including techniques which account for different intake designs and intake technologies. For example, this may allow facilities located on fast-moving waterbodies to demonstrate that they would have the same reduction of impingement and entrainment as Track I standards which include the 0.5 ft/s limitation on velocity. Or facilities may install cooling water intake structures (including structures employing velocity caps) with greater that 0.5 ft/s velocities if they can demonstrate that they would have the same reduction of impingement and entrainment as Track I standards which include the 0.5 ft/s limitation on velocity.

Comment ID 316bNFR.014.019

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

Restricting Flow So As To Require Cooling Towers Will Have Adverse Effects

EPA's proposal to limit flow to "a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system" is apparently designed to force new units to which the rule applies to install cooling towers. <FN 35> However, EPA does not have the authority under Section 316(b) of the Clean Water Act to limit water used for cooling purposes, nor is it Congress' intent to define the type of system used for power plant cooling. EPA's proposal to force the use of cooling towers will have a high cost and adverse environmental impacts, and EPA has not adequately considered those impacts.

Cooling towers can have the following adverse environmental impacts:
1) Wet towers produce water vapor containing quantities of salt that causes corrosion and area accumulation of salt in soils.
2) Wet towers produce vapor plumes that create fog and icing problems. These problems are most serious near highways, bridges, farm fields and communities.
3) Both wet and dry towers displace wetlands or other land and habitat. Cooling towers require a sizeable area for the physical system and any mitigation space for vapor effects. We estimate a 500 megawatt plant would require 5 acres for dry towers and ten for wet towers.

Wet towers use energy to operate cooling tower fans, and create lost capacity due to higher turbine backpressure. According to a UWAG consultant's report dated 1978, the energy penalty can range from approximately 2 to 4 %. Since closed-cycle systems exact an energy penalty compared to open-cycle cooling systems, these systems must use more fuel and create the same amount of marketable electricity. This creates higher air emissions, or spent fuel in the case of nuclear plants.

Wet towers cause significant evaporation of water drawn from either groundwater wells or surface water bodies. The Company's Louisa Generating Station, located near Muscatine, Iowa is a 700-megawatt plant that uses a mechanical draft tower and pumps 11.5 million gallons of groundwater per day. Consumptive use of water may be a serious problem in arid areas or areas where groundwater is in demand.

Wet towers also must use biocides and other chemicals to kill microorganisms that prevent heat transfer and scaling or corrosion, depending on the cooling water supply. These chemicals create concerns about safety during handling, storage and discharge.

Cooling towers are expensive and not appropriate for all areas of the country. In a recent study for a new cooling system for one of MidAmerican Energy's 700-mW power stations, the consultant estimates the additional cost of a mechanical draft cooling tower at $20,000,000. A UWAG consultant has determined that dry cooling systems cost about 75% more than an equivalent wet cooling system. This is because dry systems have lower performance and are more sensitive to air temperature. Dry

towers are less efficient in hot weather when electrical demand is already high due to air conditioning loads. Dry cooling systems may be useful where water is scarce, but should not be required where water is available, especially where water bodies can support open-cycle cooling systems.

Additionally, for a 700-megawatt plant, an additional 15 megawatts of capacity will be required just to power a cooling tower system. Based on current New Source Performance Standards (NSPS) for air pollution, this additional power capacity would create annual emissions in excess of

210,000 pounds of NOx
525,600 pounds of SOx, and
1,000,000,000 pounds of CO2.

These are significant quantities of air contaminants being introduced into the environment as the result of an effort to contain a perhaps non-significant and non-adverse aquatic discharge.

Footnotes

35 See Fed. Reg. 49117-119.

EPA Response

EPA disagrees with the commenter's assertion that EPA has overstepped its legal authority by imposing technology-based performance requirements relating to flow in the final rule. See the preamble and responses to comments 316bNFR.205.002 and 316bNFR.068.100, which explain that EPA may regulate the capacity of cooling water intakes, and as such, regulate the dynamic flow of water used for cooling purposes. Here, EPA is not prescribing a particular technology, but is prescribing reduction in entrainment and impingement that can be met by a specified technology that is available, economically achievable, and for which the Administrator has considered non-water quality impacts. This is analogous to the effluent guidelines and standards issued for industrial dischargers limitations under section 301, 304, and 306 of the CWA.

EPA disagrees with the commenter's assertion that EPA has defined the type of system used for power plant cooling. In fact, new facilities have many compliance and technology options to meet the flexible requirements of this rule. The technology-based performance requirements of Track I, including the requirement for reduction of flow to the level commensurate with that achieved using closed-cycle recirculating wet cooling systems, can be met using several technologies including cooling canals, cooling lakes, wet cooling towers, and dry cooling towers. EPA's analysis of the projected power plants within the scope of the rule shows that 90 percent will install one of these flow reduction technologies regardless of the requirements of this rule. Therefore, there is a clear, established basis for the technical availability and economic practicability of these technologies. Additionally, Track II of the final rule provides facilities the flexibility to meet with the entrainment and impingement reduction goals of the rule without meeting the same flow reduction requirements of Track I. See Section V of the preamble to the final rule.

EPA acknowledges, through the economic and engineering analyses that support this rule, that the compliance costs of this rule exceed $40 million (in 2000 dollars). However, EPA has accounted for the full reach of environmental, social, and compliance costs attributable to this rule.

The issues of water vapor and salt drift, fogging and icing, and displacement of wetlands and other habitat have been considered by EPA in establishing the requirements for the final rule. In responses to comments 316bNFR.068.100 and 316bNFR.068.332 EPA discusses the site-specific issues of drift, icing, and local climate impacts from wet cooling towers. Regarding the size of land required for cooling towers at power plants, EPA notes that 90 percent of the projected facilities within the scope of this rule would install towers regardless of the requirements of this rule. In addition, for those nine new power plants that EPA projects will incur the costs of installing cooling towers, in lieu of once-through systems, the cost of purchasing additional land for construction of a power plant is a negligible cost compared to the cost of the tower, let alone the entire cost of the project. Additionally, in EPA's view, the commenter is in error regarding the relative size of dry towers versus wet towers, in that EPA estimates the land area requirements of dry towers to be approximately four times that of a comparatively designed wet tower.

In terms of the energy penalty associated with wet cooling towers, EPA conducted a detailed analysis for the final rule, which determined that the mean annual energy penalty for a wet cooling tower compared to a once-through system is 0.4 percent for combined-cycle and 1.65 percent for coal-fired plants. The figures quoted by the commenter of 2 to 4 percent are undocumented and without supporting discussion and disagree with EPA's analysis results. EPA includes the economic impact of energy penalties in the final national cost estimates of this rule. Additionally, EPA conducted an analysis of the national increase in air emissions as a result of this rule and determined that the net increase was acceptable. Placing the air emissions in context of overall air emissions from new facilities the effects were negligible. See Chapter 3 of the Technical Development Document.

Regarding the evaporation of groundwater or surface water through cooling tower operation, EPA notes that not all of the 11.5 million gallons of groundwater used by the facility in the commenter's example is actually consumed due to evaporation. A portion is discharged as "blow-down" to maintain the quality of the water being recirculated. EPA also notes that according to detailed research conducted by the Nuclear Regulatory Commission, a once-through cooling system has consumptive water use issues on the order of 60 percent of the levels lost in recirculating wet cooling towers. See response to comment #316bNFR.068.100. EPA studied the water consumption levels expected as a result of this rule and found them to be small for the national. For instance the electricity generation industry would see only a 0.1 percent increase in water consumption as a result of the rule. New electric generating capacity within the scope of the rule would experience an increase of 2.7 percent water consumption due to evaporation as compared to projected baseline evaporation rates. See Chapter 3 of the Technical Development Document.

EPA reiterates that of the nine facilities expected to incur the compliance costs of wet cooling towers as a result of this rule, that the technology-based performance requirements, in combination with the two-track framework of the rule, do not force facilities to install wet cooling towers. Even if all nine facilities ultimately choose to install wet towers as a means to comply with this rule, the impacts on the nation's water supply due to cooling tower evaporation will be small and negligible. In part this is because they are small in number (less than 10 percent of those projected within the scope of this rule). Also the nine facilities are new facilities whose locations are not known. Hypothetically, none of these facilities would potentially locate in arid areas. The reason for this is that considering that massive quantities of fresh water required for once-through cooling, a planned facility of this type would be infeasible in an arid area.

EPA included in its estimates of cooling tower capital costs, those costs associated with the safe treatment, storage, and disposal of cooling tower treatment chemicals. Therefore, the assertion that EPA has not accounted for these costs is incorrect. The safe handling of these chemicals is regulated adequately by other federal, state, and local programs, and falls outside of the scope of this rule.

The commenter does not indicate whether the example provided is representative of capital or another form of costs. The commenter fails to provide the year of the costs presented. In addition, the commenter does not indicate the type of fuel used at the plant, which can greatly affect cost. Based on the commenter's company profile (as determined by EPA using the E-Grid 2000, version 2.0 database), the plant being described would likely be a coal-fired facility, since over 98 percent of the company's generation capacity is such.

The capital cost of approximately $20 million for a mechanical draft cooling tower at new 700-MW coal power plant is a reasonable estimate of capital cost for a cooling at a new facility according to EPA's estimates. EPA projects capital costs for 800-MW coal-fired power plants to range from $19 million to $39 million (in 2001 dollars), depending on the design cooling flow of the tower. EPA accounts for these costs in the final national cost estimates of this rule, which are economically practicable. See Section V of the preamble to the final rule. EPA disagrees with the commenter that cooling towers are "not appropriate for all areas of the country," as they have been demonstrated throughout the country.

EPA notes that dry cooling technologies are not the technologies upon which the requirements of the final rule are based. EPA has evaluated the generic and non-specific cost estimates included by the commenter. EPA notes that in UWAG's November 2000 comments, that a consultant working on their behalf found that costs of dry cooling systems exceed those of wet cooling systems by 140 percent, contrary to the commenter's statements. EPA disagrees with these estimates based on its analysis and finds that, generically, dry cooling tower capital costs may exceed those of wet cooling tower systems (including the associated intake structure costs) by as much as 175 percent. EPA notes that the commenter provides no specific information on the cost estimates that provides a basis of comparison to EPA's costs. Regardless, EPA agrees with the commenter's statement that dry cooling can be an useful for areas that are scarce of water, as EPA pointed out above.

EPA disagrees with the statement that "water bodies can support open-cycle cooling systems" (please see section III of the preamble for a discussion of the environmental impacts of once-through cooling).

EPA agrees generically with the air emissions calculations included with the comment. The general degree of air emissions increase likely at a 700-MW coal-fired facility, if it chose to increase production to compensate for an energy penalty, EPA's estimates would coincide, roughly, with those presented by the commenter. However, EPA points out that the estimate of 15-MW of energy penalty is overestimated, and a 1.65 percent mean annual energy penalty would decrease capacity by less than 12-MW at a 700-MW coal-fired facility. The projected increased air emissions (due to the energy penalty of wet cooling towers to be installed at nine new power plants in lieu of once-through cooling) are less than 0.02 percent per pollutant compared to the total emissions of the electricity generating industry. Considering that but four coal-fired facilities may incur such air emissions increases as a result of this rule, EPA finds that these emissions are acceptable on the national and

facility level, particularly when compared to the large reductions in impingement and entrainment that this rule will produce.

As to the commenter's assertion that EPA is attempting to "contain a perhaps non-significant and non-adverse aquatic discharge," EPA refers to the preamble and Technical development Document for the final rule and responses to comments 316bNFR.529.026, 316bNFR.068.015, and sections III and VI.B of the preamble for a discussion of the environmental impacts of cooling water intake structures and difficulties with the population approach in assessing the best performance in the context of new facilities where it is particularly important to improve certainty and speed of decision-making in the permitting process.

Comment ID 316bNFR.014.020

Subject Matter Code	125.81
Who is Potentially Subject to New Facility Rule	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

The Two MGD Criterion Is Too Low

Proposed §125.81 would apply to new facilities that have a design intake flow of greater than two million gallons per day (MGD). This threshold would force the move not only to cooling towers, but also toward the use of more groundwater for cooling. Depending on the size of the generating unit, closed cycle systems may require far more than 2 MGD.

For example, an existing 700-megawatt facility located on the Mississippi River is designed with a wet closed-cycle cooling system. The facility uses about 5.5 million gallons of groundwater per day for cooling purposes. Other industrial groundwater users are located in the area, so groundwater impacts are a concern even in a water-abundant alluvial aquifer. We believe that EPA's proposed regulatory threshold may create a greater adverse impact to groundwater in many regions.

EPA Response

The final rule does not apply to new facilities that withdraw cooling water only from ground water, only to withdrawals of cooling water from "waters of the U.S." Section 316(b) requirements are implemented through NPDES permits and the NPDES program focuses on protecting "waters of the U.S." Thus, a new facility using only ground water would not be subject to this rule. In addition, Track I of the final rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD from "waters of the U.S." Such facilities are not required to achieve a reduction in flow commensurate with the level that can be achieved using closed-cycle cooling, but must meet the velocity, proportional flow, and design and construction requirements specified in Track I. These changes reduce any potential impact of the rule on new facilities. Moreover, EPA has concluded that the compliance costs for this rule are relatively low. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available.

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and fast permitting, through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This two-track approach allows, under Track II , a case-by-case determination of best technology-available guided by the performance requirements specified in Track I. This increased flexibility also is likely to reduce the need to seek alternative source water sources.

Comment ID 316bNFR.014.021

Author Name	Steven C. Guyer, Robin S. Fortney & James M. Riddle
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Subject Matter Code 9.4

Adverse Environmental Impact

Comparison and Contrast of Preservation vs. a Management of Natural Resources Paradigm

Considering the definition of MAEI, management of resources becomes paramount over mere preservation of that which is there. Preserving would mean neither decreasing nor increasing value; however, minimizing adverse impact could be achieved by increasing future value of the environment, a concept disregarded in the CWIS proposal. Moving the plant off the waterfront is not the objective of either NEPA or Sec. 316(b). Wise, stewardly use of resources for maximum present benefit and sustained future value, through sound scientific, engineering and management practices, is the goal.

There is no nationwide paradigm, no indicator ecosystem, for CWIS design. As in the BACT of the Clean Air Act, each situation must be determined individually, on a site-specific basis. The bulk of the CWIS is not, then applicable: there is no legal or scientific basis for asserting categorically any baseline or indicator qualities based on location of the intake, velocity or flow of the intake, or an open-cycle vs. closed-cycle cooling system.

EPA Response

Please see responses to comments 316bNFR.014.013 and 316bNFR.014.019.

Comment ID 316bNFR.014.022

Subject Matter Code	18.2
Compliance Cost/Revenue Test	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

Economic Analysis Techniques, Considerations and Assumptions

This section of comments regards the benefit-cost analysis portion of the CWIS proposal document and its assertions and allusions to standard engineering economy techniques. The economic analysis is incomplete and technically supports incorrect conclusions. The benefit-cost analysis speaks in terms of ratios of compliance cost estimates to revenues, a percentage of total cost represented by compliance cost, and so on. In engineering economics, the only valid means of comparison of alternatives and making judgments regarding whether or not an investment should be undertaken are those which assess the actual time-value of a specific investment alternative:

Net present value (NPV)
Equivalent annual cost (EAC)
Future value (FV)
Discounted cash flow rate of return (DCFROR)
Growth rate of return (GROR)

The proposal uses a compliance cost/revenue test that incorporates estimated annual revenues, which the Agency claims is a screening tool for which data can readily be projected, using average industry costs, and "provides a reliable measure of whether costs are 'economically practicable.'"<FN 36> The Agency further claims that DCFROR "is not appropriate for new facilities because of a lack of available data and the analytic requirements it would impose … this test would require far more estimation and would be far less precise than other tests." <FN 37>

In fact, nothing could be further from the truth on an engineering level.

Design and analysis accurately predict and identify the data and analytic requirements of DCFROR on a daily basis in the engineering world. True and correct identification of the detailed expected costs and revenues, in total, for a project is the only means by which an engineering decision to proceed with or to cancel a project can be reached. The analysis of capital projects and the comparison of alternatives is well-documented in the literature, and has been since prior to NEPA.<FN 38> "Economic practicability" to a corporation is, simply, whether the proposed action serves to maximize wealth of the organization. This, in turn, requires that the project have:

*A positive net present value calculated at an interest rate equal to an established minimum rate of return
*A positive future value calculated at an interest rate equal to an established minimum rate of return
*A positive equivalent annual cost calculated at an interest rate equal to an established minimum rate of return
*A discounted cash flow rate of return equal to or greater than the established minimum rate of return
*A growth rate of return in excess of the established minimum rate of return<FN 39>

The calculations to determine any one of these are unique and site-specific. They are a part of the determination of best technology available, because the best technology available must meet the operator's criteria for a minimally acceptable level of return on investment to be economically practicable.

On an overall level, the principles of engineering economics can be expanded to include not only the permitee's perspective of the proposed operation but also to address maximizing benefit from utilization of the environment. The science of comparing alternatives is well-addressed in the literature of engineering economy. Analysis at deeper and more appropriate levels, analyzing benefits and costs which reflect not only value to the Company but also the value to the public, should offer a quantitative approach to minimizing adverse environmental impact.

Footnotes

36 65 FR No. 155, Thursday, August 10, 2000, p. 49095.

37 Ibid.

38 Thuessen and Fabrycky, Engineering Economy, 1965, or Stermole, Economic Evaluation and Investment Decision Methods, 1969, for example.

39 The established, minimum rate of return for a company is generally the inverse of the price-earnings ratio and is somewhat reflective of the lending rate major financial institutions will make for it.

EPA Response

EPA disagrees with the commenter's argument that the economic analysis is incomplete, uses inappropriate techniques, and thus may support inappropriate conclusions.

The commenter argues that the analysis requires the use of techniques common to engineering economics, which require unique site-specific data in order to determine whether compliance costs are economically practicable for a given facility. However, because the new facilities expected to be in-scope of the final rule are projected facilities yet to be proposed or developed, the site specific data required to complete the engineering economic analyses proposed in the comment are not available. Developing site specific data for projected facilities would require an extrapolation of information derived from proposed new facilities currently under development for which the required data are available, thus opening the analysis to greater uncertainty. Given the lack of site specific data, the economic impact analysis of the final rule utilizes the ratio of annualized compliance costs to revenues and the ratio of undiscounted initial compliance costs as a percentage of construction costs as measures of whether costs are economically practicable for new facilities. Based on the low impacts observed in this analysis, EPA believes that compliance with the final rule is economically practicable.

EPA's analysis further indicates that the vast majority of new projected in-scope generators (93 percent of combined-cycle and 71 percent of coal) are being designed with recirculating cooling systems in the baseline, and would therefore already meet the most costly requirements of the rule. This finding further indicates that the requirements of the final rule are economically practicable. For additional information regarding the estimation of facility compliance costs please see Chapter 6: Facility Compliance Costs of the Economic Analysis document. The economic impact analysis is

presented in Chapter 7.

Comment ID 316bNFR.014.023

Subject Matter Code	22.1
	CWIS Impacts and Benefits

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

The Company has substantial interest in this rulemaking because of its impact on our ability to site future generation capacity flexibly – where it is needed and in a timely fashion. Flexibility will be even more important as deregulation affects our ability to serve industrial, commercial and residential customers.

EPA Response

EPA has considered the commenter's concern. Under the final section 316(b) New Facility Rule, facilities may be sited on any surface water body as long as the facility is in compliance with the proportional flow requirements. (For more information on the proportional flow requirements, please refer to preamble of the final rule.) In addition, in contrast to the proposed rule, the final rule does not establish different requirements for different water body types or locations within a water body. Therefore, the final rule does not create a disadvantage for certain sites compared to others.

In response to concerns about the timely siting of future generation capacity, EPA has designed the final section 316(b) New Facility Rule to allow for expedited permitting. The two track approach allows facilities to avoid lengthy pre-operational study requirements, as are common under the current site-specific implementation, by complying with the requirements of Track I. Please refer to the response to comments 316bNFR.512.003 (comment category 23.6) and 316bNFR.524.085 (comment category 21.4).

Comment ID 316bNFR.014.024

Author Name	Steven C. Guyer, Robin S. Fortney & James M. Riddle
Organization	MidAmerican Energy Holdings Co.

Subject Matter Code 10.01

Regulatory Framework Options

The minimum performance standards that EPA has set would preclude new facilities from using other proven CWIS technologies, such as wedgewire screens, which have been shown to reduce velocity and entrainment of mobile early life stage organisms.

We encourage EPA to acknowledge the legitimacy of the site-specific approach.

EPA Response

EPA has acknowledged the legitimacy of the site-specific approach by establishing the two-track technology-based approach. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of also allowing flexibility by including a performance-based alternative. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

Comment ID 316bNFR.014.025

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

A second proposed definition follows the CWA draft guidance document definition of adverse environmental impacts, stating that they would occur "whenever there would be entrainment or impingement damage as a result of the operation of a specific cooling water intake structure." FN 13 The CWIS proposal further states that the Agency "could clarify through guidance when the magnitude of environmental impact is great enough to be deemed adverse." FN 14 This approach, again, offers the non-help of relative judgment – is the impact, if it is indeed there, "great enough to be deemed adverse?" This requires a value judgment, rather than a scientifically certain determination.

The third proposed definition suggest that adverse environmental impact occurs "whenever aquatic organisms are impinged or entrained as a result of the operation of a cooling water intake … any impingement or entrainment of aquatic organisms." FN 15 While this is a true measure of whether an impact occurs, the magnitude and value of the impact are not explicitly measured and this definition cannot, of itself, express adversity.

A fourth proposal is to define adverse environmental impact "in relation to reference sites for the type of ecosystem in which the facility proposes to locate the intake structure and then to evaluate the projected impact of the intake structure on the abundance, diversity and other important characteristics of the aquatic community that would be expected to inhabit the site … analogous to the adoption of biocriteria into State water quality standards." FN 16 This definition is probably getting closer to a workable concept. Certainly the evaluation of any CWIS is a site-specific action, as identified by the Agency; so comparison with some baseline and reference system similar, if not identical, to that CWIS would have value. The analysis would require a comprehensive assessment of the existing quality of the stream and maintenance of that quality. Using a reference site, however, might well ignore significant vagaries and idiosyncrasies of the particular CWIS which add to or detract from the magnitude of a specific impact, adverse or favorable.

Footnotes

13 U.S. E.P.A., Draft Guidance, 1977, p. 11.

14 65 FR No. 155, Thursday, August 10, 2000, p. 49074.

15 Ibid.

16 Ibid.

EPA Response

Please see responses to comments 316bNFR.507.004, 316bNFR.014.013, and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.014.026

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

The Agency also finally "invites comment on whether it should define adverse environmental impact more broadly and consider non-aquatic adverse environmental impact as well." <FN 17> Section 316(b) itself addresses simply "environmental impact;" <FN 18> it does not limit concern only to impact occurring in aquatic regimes. We suggest that the definition of adverse environmental impact must consider the total environment, not merely the aquatic regime.

Footnotes

17 65 FR No. 155, Thursday, August 10, 2000, p. 49074.

18 Sec. 316 [33 USC 1326] Thermal Discharges

EPA Response

For the final rule, EPA interpreted adverse environmental impact to include a broad range of impacts that result from the operation of cooling water impact structures. As the same time, as it does in establishing NSPS and BAT for existing facilities, EPA considered the non-water quality environmental impacts of the technologies that formed the technology basis of the regulations.

See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Comment ID 316bNFR.014.027

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

The Company's position, in review of these proposals, is that adverse environmental impact must be defined explicitly before appropriate analysis and design can proceed on any given CWIS. The definition must imply considering site-specific conditions (although definition and analysis certainly can draw on similar reference sites and ecosystems). The definition cannot be based on arbitrarily selected values for parameters, although for a specific site, values for those parameters might possibly be expressed or determined to indicate the breakpoints between desirable, nominal and adverse impacts.

Prior guidance from the Agency, in the preamble to 316(b) itself, indicates that a number of different factors should be considered when the existence of any adverse environmental impact is to be determined. <FN 19> It is necessary to define adverse environmental impact to determine which factors cause adverse environmental impact; it is necessary to determine which factors cause adverse environmental impact because those are the factors of design and operation which will be dealt with or modified to change those impacts; and, those factors must be changed, because it is the responsibility of the regulated operation to comply with the CWA and to minimize any adverse environmental impacts (AEI). It is not the obligation of the discharger to avoid the AEI completely, but to minimize them.

Adverse implies negative change in value. Any assessment of change in value requires someone or something to realize the value or loss of value. The National Environmental Policy Act (NEPA) <FN 20> establishes a national policy to be a "trustee of the environment for succeeding generations" and to attain the widest range of beneficial use without degradation, risk or other undesirable or unintended consequences, achieving "a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities." In simpler terms, we are charged to provide, to the population, a return through our investment in and stewardship of our environment without depleting the principal. In context of NEPA, then, the concept of environmental impact includes not only undesirable consequences but positive returns, and the receivers and holders of value are both the environment and the population. Adverse environmental impact would, in this context, be defined as

adverse environmental impact results if an action fails to fulfill positively a responsibility as trustee of the environment for future generations by decreasing the net value of the environment and/or if the action fails to attain the widest range of beneficial use of the environment.

Therefore, the definition of AEI is not limited to the effects on the environment or ecosystem, as inferred from the CWIS proposal, but also extends beyond the ecosystem and to inappropriate or unfulfilled use of the resources for the benefit of the population.

Footnotes

19 41 Federal Register, April 26, 1976, p. 17389.

20 Publ. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended

EPA Response

Please see responses to comments 316bNFR.014.013 and 316bNFR.014.009.

EPA does not believe that the NEPA governs EPA's interpretation of 316(b). As stated elsewhere in the comment response document, EPA believes that it is reasonable to interpret section 316(b) of the CWA in a manner analogous to other technology-based provisions of the CWA and to interpret AEI in a manner that reduces impingement and entrainment without demonstrating receiving water quality impacts.

EPA agrees that there are aspects of AEI that extend beyond direct effects to the aquatic ecosystem. As discussed in preamble section VI.B.2.a, AEI includes impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population’s potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function. EPA believes that there are human benefits inherent to several of these impacts (e.g., losses to recreational fisheries may represent reduced overall human benefits as compared to a healthy, productive recreational fishery.)

Comment ID 316bNFR.014.028

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

It is important that the 316(b) rules are based on a sound, scientific basis. The rules need to establish a process that allows the permittee and permitting agency to determine whether a proposed intake structure is appropriate for a particular site. In order to do this, the permittee will have to produce data to assess the potential for adverse environmental impact, and where potential exists, to evaluate the availability, cost and benefits of alternatives. This means that EPA will need to recognize CWIS and/or facility characteristics that are low-risk alternatives in most cases. This may mean that EPA needs to offer guidance on how to determine the potential for AEI, what CWIS technologies are available, how to evaluate the benefits and costs of these technologies, and what criteria permit writers should use to select BTA from among the alternatives.

EPA Response

EPA believes that the two-track technology-based approach does allow permittees and permitting agencies to work together to determine whether a proposed intake structure is appropriate for a particular site. Permit writers will not mandate BTA. With this approach the permit writer does not have to determine what the potential AEIs are for a particular permittee just whether the facility is proposing technologies that will meet the performance requirements in Section 125.84. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet these requirements.

The Technology Development Document presents information on available CWIS technologies and technology costs.

Comment ID 316bNFR.014.029

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

Author Name Steven C. Guyer, Robin S. Fortney & James M. Riddle

Organization MidAmerican Energy Holdings Co.

Defining AEI is only the first step. The next is to determine whether AEI is reasonably likely to occur due to a proposed CWIS and/or facility site. We support UWAG's proposed screening procedure to identify sites and CWIS designs that will crop no more than 5% of any population of Representative Indicator Species (RIS). The concept of Representative Indicator Species recognizes that not all aquatic species within a facility's area of influence need to be studied in order to understand the facility's potential for impact. With the support of the permitting agency, the permittee should identify a group of species that will be representative of the community as a whole. Using best professional judgment, the grouping should include representatives of commercial or recreational fishery species, forage species and any threatened and endangered species in the area.

EPA acknowledges that the concept of representative species is a useful alternative to studying the entire ecosystem. The proposed rule requires a baseline biological characterization that requires the permittee to identify (1) up to ten species most important in terms of significance to commercial and recreational fisheries and the forage base and (2) all threatened and endangered species potentially susceptible to impingement and entrainment. <FN 25>

The permittee must first determine the size and extent of the potentially affected water body. Factors may include the presence and operation of man-made barriers to fish migration, extent and patterns of fish migration and typical flow conditions. These factors are particularly important on rivers such as the Missouri and Mississippi that are controlled by a system of dams and reservoirs.

To determine whether the facility would crop less than 5% of any RIS, the applicant would then need to examine and evaluate the following factors:

Location Risk: Would the proposed CWIS location present a risk of exceeding the protection goal? For example, the applicant would need to verify that there were no localized spawning or nursery areas near the proposed intake. If not, the permittee would move to the next decision point.

Surface Water Body Volume Use Risk: Would the facility pose risk due to flow requirements? If closed-cycle cooling is proposed and less than 5 % of the water body will be used, the 95% protection goal would be met.

Facility Design Risk: If entrainment were still a concern, the facility could propose entrainment design mitigation features, or decide against the use of biocides.

Aquatic Population Risk: This step would consider RIS data or information to determine if there is a risk of exceeding the 95% protection goal. For example, the permittee could conduct site-specific studies that might demonstrate how behavioral factors will reduce the population mortality estimate.

If the permitting agency finds that the proposed CWIS will meet the 95% protection goal for the RIS,

then the permittee can proceed. EPA will need to provide guidance on this process.

Footnotes

25 Fed. Reg. 49120.

EPA Response

EPA believes that the CWA does not compel commenter's approach, see the preamble to the final rule and responses to 316bNFR.068.007; 316bNFR.068.008; and 316bNFR.206.014.

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

All cooling water intake flow results in the potential for impingement and entrainment. For this reason, EPA did not adopt an approach in the final rule that focuses primarily on assessing whether AEI is occurring. Rather, the rule establishes technology-based performance requirements and offers new facilities the option of meeting these requirements through the use of technologies that most effectively reduce harmful environmental impacts at their site. EPA did not adopt commenter's screening procedure because such a screening level is difficult to establish on a national basis and it, in effect, allows certain impacts to continue unabated, which is not fully consistent with the objective of 316(b) to apply best technology to minimize adverse environmental impact. The final rule does include proportional flow requirements that have been demonstrated to be achievable at new facilities. See discussion in sections VI.C. and D of the rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William Sarbello

On Behalf Of:

Self

Author ID Number:

316bNFR.015

Note

No comments were coded for this letter. The text and author are the same as 316bNFR073.

Comment ID 316bNFR.015.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name William Sarbello

Organization Self

No comments were coded for this letter. The text and author are the same as 316bNFR073.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Donald R. Perander

On Behalf Of:

AK Steel Corp.

Author ID Number:

316bNFR.016

Comment ID 316bNFR.016.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Donald R. Perander

Organization AK Steel Corp.

Iron and steel production by its very nature requires large quantities of water. Like many other steel plants, we have water intakes that have been in service for decades that have been with-drawing water for use in both process and cooling systems. Although the proposed rule addresses new cooling water intake structures, we believe it is important to evaluate the proposal relative to existing facilities, as well, because the EPA will be proposing rules for existing cooling water intake structures in the future.

EPA Response

See response to comment 316bNFR.012.003 and the preamble to today's rule.

Comment ID 316bNFR.016.002

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Donald R. Perander

Organization AK Steel Corp.

Decisions to promulgate this rule and those pertaining to existing structures are prompted by concern that some very large intakes located in ecologically sensitive areas may be causing adverse impacts. While we support the regulatory need to address significant potential for adverse environmental impacts where they exist, we believe EPA has overreached in its application of the rule to intake structures, whether new or existing, with little or no potential for causing such adverse impacts. As noted above, intake structures have been in place for many years, and there has been no evidence of adverse impacts. We are not aware of any concern expressed by any agency, in the States where AK operates, about water intakes. The only significant problem associated with intakes is Zebra mussels attaching themselves to the intake screens and elsewhere within the structure. The fact that these exotic organisms are present in the water would have a much more adverse impact on aquatic life than the intake structure itself.

EPA Response

EPA is not just concerned with the adverse impact of a single intake structure but is also concerned about the cumulative overall degradation of the aquatic environment by multiple intakes and the location of intakes within or adjacent to impaired waterbodies. EPA analyses suggest that more than 99 percent of surveyed existing cooling water withdrawal facilities are located within 2 miles of waters that are identified as impaired and listed by a State of Tribe as needing development of a total maximum daily load (TMDL). Also, EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. Finally, while EPA recognizes that biofouling is of concern in selected cases, for the majority of cooling water intakes it is not the primary issue. EPA also has a record for new facilities indicating a large number of new facilities would meet the requirements independently of this rule. Establishing the two-track approach thus expedites permitting for these facilities. See sections III and VI.B. of the Preamble for additional discussion of these issues.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.016.003

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Donald R. Perander

Organization AK Steel Corp.

As noted in the preamble to the rule, a single intake structure often serves to bring water into a plant for both process water and cooling water applications, and EPA's Section 316(b) jurisdiction is limited to cooling water. EPA proposes to address this issue by defining a cooling water intake as one where 25% or more of the water withdrawn is used as cooling water. Any attempt to establish any single cooling water percentage as a limiting factor for a manufacturing facility is impractical because the relevant distribution of process and cooling water can vary widely from plant to plant. If a number is necessary, we suggest 75%.

With respect to the possible application of this provision to existing sources in the future, it should be noted that companies are continually striving to reduce process water usage, both to conserve resources and to meet increasingly tighter effluent standards. As process water is reduced, the percentage of intake water used for cooling water can potentially increase. If the percentage of cooling water triggering applicability of this rule is set too low, companies will lack the incentive to reduce process water consumption. In other words, a cooling water percentage should not apply in these situations because the intake velocity has actually decreased.

More importantly, however, there needs to be recognition that water is typically used and reused repeatedly and in different ways within steel plants. Some treated process water may ultimately be used for cooling and cooling water may ultimately be used as process water. Any rule that encourages the segregation and recirculation of cooling and process water will tend to increase the usage of both and be counter-productive to protecting the environment.

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

EPA chose twenty-five percent as a reasonable threshold for the percent of flow used for cooling

purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.016.004

Subject Matter Code 15.11

Mandatory Approaches

Author Name Donald R. Perander

Organization AK Steel Corp.

Restoration and mitigation requirements are inappropriate and should be dropped. EPA has no authority to require restoration measures because Section 316(b) only authorizes the Agency to require the use of technology for cooling water intake structures.

EPA Response

See preamble sections V.B.2.f and VI.L for discussions on restoration measures in Track II.

Comment ID 316bNFR.016.005

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Donald R. Perander

Organization AK Steel Corp.

Adverse Environmental Impact (AEI) is not adequately defined. We believe a proper definition of AEI is fundamental to the intent of any regulations established under the authority of Section 316(b) and concept of determining fish and aquatic health and vitality based on fish population rather than the fate of a single organism. AEI is by its very nature a site-specific determination, which makes a uniformly applied intake structure technology wholly inappropriate as a standard under 316(b). EPA's improper interpretation and its lack of understanding of this distinction is manifested in its requirement under Section 125.86-87, where biological studies are called for even if intake structures are designed in accordance with requirements of Sect 125.84. The Agency appears to want it both ways. If a structure is designed for an intake velocity of 0.5 ft/sec, when the preamble states that fish can endure an intake velocity of 1.0 ft/sec, biological studies are neither necessary nor a wise use of resources.

EPA Response

Please see responses to comments 316bNFR.507.004, 316bNFR.030.007, and 316bNFR.014.009.

Comment ID 316bNFR.016.006

Subject Matter Code 125.84.4

Compliance in Ocean

Author Name Donald R. Perander

Organization AK Steel Corp.

Proposed section 125.84(e)(ii) is particularly problematic because it would restrict intake volumes based on that needed for make-up to recirculating cooling water systems. We have several cooling water systems each with different chemical control or make-up requirements. Dictating limitations on cooling water intakes based on a common set of assumptions applicable to only a single closed-cycle system would be inappropriate. Moreover, a restriction on cooling water intake may affect the amount of process water that can be withdrawn from the same intake structure. This requirement should be dropped from the proposed rule.

EPA Response

The final rule applies to new facilities only, existing facilities will be addressed under Phase II and III regulations.

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. Under Track I, new facilities that withdraw greater than 2 MGD and less than 10 MGD are not subject to the dynamic flow requirements. Thus, intake volume restrictions are not mandated under Track II or if the new facility withdraws less than 10 MGD. In the final rule EPA is not dictating limitations on CWIS based on assumptions applicable to only a single close-cycle system. If one intake serves several cooling systems, the total make-up would determine the dynamic flow reduction.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Paul L. Zweiacker

On Behalf Of:

TXU Business Services O-B-O TXU Generation

Author ID Number:

316bNFR.017

Note

Fully supports the comments made by UWAG (316bNFR.068). Text of comments entered nearly identical to 316bNFR049, with some additions.

Comment ID 316bNFR.017.001

Subject Matter Code OPP

General Statement of Opposition

Author Name Paul L. Zweiacker

Organization TXU Business Services O-B-O TXU Generation

TXU is very concerned with EPA's overly prescriptive proposed rule and does not believe utilizing a set of national criteria for cooling water intake structures for new facilities is necessary, appropriate, or workable for the State of Texas.

EPA Response

EPA believes that it has developed an adequate record supporting the basis for CWIS regulations and does not believe that the regulations are overly prescriptive.

Comment ID 316bNFR.017.002

Author Name Paul L. Zweiacker

Organization TXU Business Services O-B-O TXU Generation

Subject Matter Code 10.0

Best Technology Available

Throughout the TXU system, we have worked closely with the Texas Parks and Wildlife Department (TPWD) in cooperation with their activities to monitor and manage the fisheries. For this reason, TXU reservoirs have provided a continuous and successful source of recreational fishing to the public. At no time, however, has the TPWD ever expressed a concern or identified a problem related to a possible impact of our cooling water intake structures on the fisheries, or a reservoir's biological community as a whole.

EPA Response

Via Section 316(b) of the Clean Water Act Congress requires that EPA establish national requirements applicable to the location, design, construction, and capacity of cooling water intake structures to minimize the adverse environmental impact associated with the use of these structures on waters of the U.S. The final rule published today applies to new facilities as defined in Section I.A. Rules to address requirements for existing facilities, which may include your facility, will be promulgated in 2002 (large power generating facilities) and 2003 (smaller power generating facilities and specified manufacturing facilities). For this rule for new facilities, EPA has adopted a technology-based approach to the new facility rule for the reasons discussed in the preamble to the final rule and elsewhere in this comment response document.

Comment ID 316bNFR.017.003

Subject Matter Code OPP

General Statement of Opposition

Author Name Paul L. Zweiacker

Organization TXU Business Services O-B-O TXU Generation

Based on our unique experience and knowledge of Texas reservoirs, TXU feels compelled to comment on these overly prescriptive yet non-site specific, proposed regulations.

EPA Response

EPA will respond to all comments provided.

Comment ID 316bNFR.017.004

Subject Matter Code	10.012
Lake/Reservoir--Proposed Standards	

Author Name Paul L. Zweiacker

Organization TXU Business Services O-B-O TXU Generation

Other than the occasional ox-bow, the only natural lake in Texas is Caddo Lake. Located in the far east portion of the State, and shared with Louisiana, Caddo Lake was created by seismic activity approximately 400 years ago. All other "lakes" in Texas are actually manmade reservoirs. These reservoirs have been constructed for single or multiple purposes to provide potable water sources, flood control, recreation (i.e., boating, swimming, skiing, sports fisheries, etc.) and/or industrial use.

In general, these reservoirs are impoundments of the main channel of a river or stream. They are relatively shallow, often with gently sloping bottoms over a wide variety of substrates. One of the most important aspects of these reservoirs is that seasonal pool level fluctuations are expected. Each reservoir, and its dam or retaining structure, is designed for a specific target normal pool level or water elevation. The normal pool level is determined to be the optimum storage capacity, but it is a target, not a constant. Water releases are generally managed in two ways. Some reservoirs utilize a passive overflow or spillway system that allows all water above a certain level to escape. At other reservoirs, the managers strive to maintain the pool level through mechanical gates or valves by either retaining or releasing water. Frequently there is also some form of continuous flow-through to maintain downstream conditions. Because of water rights and dam safety concerns, above-normal pool levels usually do not occur for extended periods of time. It is not, however, unusual for reservoirs in Texas and the southwest to be well below normal pool levels by the end of the summer season because of the seasonally dry/hot temperatures and high evaporation rates.

With no natural true "lake" flora and fauna present, these reservoirs support a combination of introduced lacustrine and adaptive riverine fish species. The fisheries in the public reservoirs are usually stocked and managed to support sports fishing, a major recreational industry in the State. The usual fish stocking regimes include predator species, strains and hybrids (e.g., largemouth bass, catfish, crappie, etc.) and prey species/hybrids such as sunfish, minnows and shads. For example, in 1998 the Texas Parks and Wildlife Department (TPWD) stocked over 8 million Florida-strain largemouth bass. Over time, and at various locations, the State has also introduced striped bass, redfish, carp, tilapia, and other non-native species. There are also a growing number of invasive exotic faunas present or threatening, such as Asiatic clams, zebra mussels, and a recently discovered mud crab.

With little natural seed bank present, and no managed vegetation stocking program, the reservoir's aquatic flora develops slowly and can result in unbalanced and/or low diversity plant communities. In recent years, many reservoirs have become increasingly dominated by exotic nuisance plants such as hydrilla (Hydrilla verticillata). These invasive plants often have a negative effect on the fisheries by reducing the available nesting/spawning areas, influencing recruitment of certain species, and frequently shifting the location of the littoral zone by altering the depth of light penetration and the associated dissolved oxygen levels.
From this description, it is easy to see that such reservoirs represent a contrived ecosystem. The fisheries are created, modified, and managed for a variety of human needs, with little initial natural material or circumstances to build from. This is not to say that they do not support successful and

sustainable fisheries, only that the terms "natural," "typical," or "balanced indigenous community" are not appropriate. The eco-system and characteristics of each reservoir is unique, and each reservoir should be viewed independently.

EPA Response

EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. Under the two-track technology-based approach adopted in the final rule, an applicant may conduct site-specific studies to determine where best to site its intake (inshore or offshore) under the Track II option as long as it can be demonstrated that the chosen location would achieve the same impingement and entrainment reductions as the Track I requirements. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns and promote the use of most appropriate and effective technologies.

Comment ID 316bNFR.017.005

Subject Matter Code 125.83.14

Definition: Littoral Zone

Author Name Paul L. Zweiacker

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Littoral Zone: The proposed definition of "Littoral Zone" is at times either too specific or too vague. A littoral zone, for fresh water, is defined in The Oxford Dictionary of Natural History (1985) as:

"The zone in shallow fresh water and around lake shores where light penetration extends to the bottom sediments, giving a zone colonized by rooted plants."

This is a widely accepted description of a concept that can only be defined in general terms. The concept of a littoral zone, and its description, does not lend itself for use as a rigorous regulatory tool. This is because the location and/or the depth of a littoral zone is often dynamic, and is influenced by many natural and anthropogenic factors. Some of these factors are:

water level fluctuation (extended periods of drought or of excessive rainfall)
water quality (turbidity, nutrients, pH, etc.)
water temperature (ambient, heat load, etc.)
water movement (wave action, velocity, etc.)
flora and fauna (native or exotic, natural or stocked, species diversity, etc.)
temporal influences
waterbody latitude (solar exposure)
waterbody bottom topography and/or bathymetry
waterbody uses
source water
substrate
surrounding land type and use

Many of these factors can be somewhat related, or even highly interdependent, but a change to any one factor can alter the location and/or depth of the littoral zone. The two following examples are provided to help illustrate the effects of some of these factors.

Beginning in the late 1980's, TXU's Martin Creek reservoir (5,020-acres) developed an extensive infestation of the exotic nuisance aquatic plant Hydrilla (Hydrilla verticillata), affecting more than 2,000 acres. Before the infestation, the reservoir had water clarity of 2-3 feet, typical of other similar reservoirs in that region of the State. The presence of the Hydrilla had a dramatic effect on the water clarity, by helping to "drop out" the suspended solids. During the infestation, the water clarity (i.e., the littoral zone) expanded to a range of greater than 7 feet. Over the past two years, due to several factors (e.g., drought, seasonal warm temperatures, biological controls, etc.) the infestation has been abated. The pre-infestation water clarity values have returned. How would this situation be addressed using the proposed definition? Would it consider that Hydrilla is a nuisance species, outlawed in the State? Would it consider that its presence also adversely affected the fisheries, limiting recruitment? Would it consider the drop in aquatic plant diversity experienced during the infestation?

A second example concerns TXU's Squaw Creek reservoir (3,228-acres) constructed for use as a cooling water source and inundated in the late 1970's. The power plant, however, was not placed online until 1990. During the first decade, because of its water source, location, and depth, the water clarity was unusually high (approximately 20 feet). The introduction of a heat load, in the form of once-through cooling, resulted in a much more productive waterbody. Due to the increased energy input, planktonic growth expanded tremendously and water clarity decreased to 2-3 feet. Another effect was that the overall fisheries improved.

How would the littoral zone of a new reservoir be determined? Would its purpose, or eventual use be considered? Would the expected increased productivity and diversity be considered?

In addition to the season pool level fluctuations discussed earlier, drought conditions create another concern. Currently, many areas of Texas are in a five-year drought period. During this time, many reservoirs have experienced extended periods of below normal pool level elevations. Littoral zones have been established at locations and depth that will not survive, when and if, normal pool levels return. One TXU power plant reservoir, Lake Colorado City, which also serves as a municipal drinking water source, endured a 7-year drought period. During this time period, water levels declined to 17 feet below normal pool level. One localized, extremely heavy rain event this spring raised the reservoir 15 feet. As a result of the sudden rise in water levels, the water clarity decreased and the previous littoral zone is no longer functional, nor has the renewed zone fully re-developed.

What if natural conditions are reasonably expected to periodically and dramatically alter the location and depth of the zone for extended time spans?

Land use and development, particularly in urbanized and/or agricultural areas, often result in dramatic changes to a littoral zone. Changes in land use can result in alteration of water quality (e.g., sediment loading, changes in nutrient values, etc.). It can also change the solar loading, wind/wave effects, and species diversity. Upstream or source water diversions can alter the littoral zone by changing the in-source flows, flow regiments, or entry points.

For Texas reservoirs, there are also several specific terms and concepts in the proposed definition that is ambiguous or overly broad. The phrase "level of highest seasonal water" is far too broad. It does not consider natural disasters such as floods, or brief, unusually high water levels due to heavy rains. In both of these cases, large areas of land that do not perform a function similar to a littoral zone would be included in the scope of the definition. A better phrase would be "average high water mark" which would limit the inclusion of normally upland or otherwise dry areas. In addition, the phrase "to the deepest point at which submerged aquatic vegetation can be sustained (i.e., the photic zone . . .(etc.)" is ambiguous. The word "can" creates a problem. There are many locations where because of light penetration, slope, and substrate, submerged aquatic vegetation "could" or "can" be supported, but because of other natural forces (i.e., wave action, water currents, etc.) they do not. The word "can" however, would result in the inclusion of such areas with the definition. If an area does not support the function, it should not be included. To do so would only compromise the concept and result in costly expenditures to avoid areas that are incorrectly identified as a littoral zone by the proposed definition.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define the best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.017.006

Subject Matter Code 125.83.6

Definition: Design Intake Velocity

Author Name Paul L. Zweiacker

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Design Intake Velocity: Based on the discussions provided in the preamble concerning the various types of velocities associated with an intake structure, the definition offered appears to be unfounded, or at the least, inappropriately applied. It also appears that the 0.5 ft/s (feet per second) is somewhat of a "magic" number, without pedigree.

In 1993-1995, TXU completed a 316(b) demonstration for its Comanche Peak Steam Electric Station. The facility has two 1150 MW units. The cooling water intake structure (CWIS) is situated on a manmade recess of the natural shoreline where water depth is approximately 50 feet. The distance from the CWIS to the edge of the recess/natural shoreline connection is approximately 75 meters. The average approach velocity measured for the demonstration was 0.427 ft/s which means the through screen velocity would necessarily be higher. Nevertheless, the intake technology was found to be Best Technology Available, and the demonstration was approved by EPA Region VI in 1995. This shows that in this case, a 0.5 ft/s through screen velocity would have been overly protective and unnecessarily costly. It also indicates that velocity does not determine impingement.

For Texas reservoirs, the establishment of a requirement to meet a fixed velocity at virtually all possible water elevations is incredibly onerous. As discussed earlier, pool level fluctuations are normal, and on some occasions, dramatic. Changes in pool elevation will necessarily result in changes to the intake velocity. As a system tries to maintain a water intake rate from a decreasing source, the velocity will increase. In order to account for both the reasonably expected, and drought induced unexpected fluctuations, the overall size of an intake structure must be increased several times over. This will dramatically increase the cost of siting, construction, operation, and maintenance. In the case of designing for a drought, undoubtedly the cost would be wholly disproportional to the environmental benefits expected. It may also have societal cost in aesthetics and by limiting access to larger portions of a waterbody for anglers and other recreational users.

Another consideration is that during a typical year, the low pool levels occur during the late summer/early fall period. This is well after the spawning/nursery seasons for the large majority of fish species, particularly those that would be considered representative species found in Texas reservoirs.

For the reasons discussed above, TXU is convinced that a case-by-case velocity standard, as opposed to mandatory uniform national velocity standards, would be a justifiable approach for limiting impingement. Also, any velocity value used should be the approach speed, not the through screen.

EPA Response

See response to comment 316bNFR.049.003.

Comment ID 316bNFR.017.007

Subject Matter Code 125.83.17

Definition: Natural Thermal Stratification

Author Name Paul L. Zweiacker

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Natural Thermal Stratification: The concept and description of a Natural Thermal Stratification, like Littoral Zone, does not lend itself for use as a rigorous regulatory tool or benchmark. In addition, the concerns expressed in the preamble discussion on protection of a "natural thermal stratification" miss the point and are based on an erroneous assumption. Indeed, the use of hypolimnion water is actually more protective of the aquatic biological community. This is due to the depressed dissolved oxygen levels found in that zone. There is little or no biological activity present. Thus, in most cases, any water withdrawn from that zone displaces a like volume of the more biologically active water from the upper zone, or epilimnion. This would, in fact, serve to reduce the number of aquatic organism that are impinged or entrained.

In Texas reservoirs, natural thermal stratification (which would seem to be very similar to a thermocline) is both temporary and inconsistent in both the temporal and spatial context. In fact, in many years, it is either not present, or so restricted it cannot be easily located. The occurrence and location of a thermal stratification is highly dependent on a number of natural factors such as seasonal ambient temperatures, water clarity, water depth, etc. Changes, or alterations, in any one of these factors affect if, when, or where a natural stratification occurs. There are also a number of anthropogenic factors, which may not be considered "natural," that can alter the occurrence and location of a thermal stratification. These include source water inflows, water withdrawals, water uses, wastewater discharges, and flow/level management practices (e.g., many reservoirs release water from below the surface, close to deepest areas).

Because of the many factors involved, it is not possible to accurately predict if, when or where a "natural thermal stratification" will develop. It may not be possible to state and verify that an intake structure's operation will never alter it. If a "natural thermal stratification" is similar or synonymous to a thermocline, then it would be based on a sharp vertical drop in temperature 1C per meter. Using that description, even the introduction of the heat load from a power plant's once-through cooling water discharge (usually 1C above ambient water temperature), which is supplied by the cooling water intake structure, is also a factor. It seems ironic that in using the definition and requirements presented in these proposed regulations, if a natural thermal stratification is present, a failure to operate the cooling water intake structure could result in an alteration of natural thermal stratification. Of course, the opposite could also be true.

Considering the natural variability in the occurrence, location, the scope, and the number of other factors that have influence, particularly in Texas reservoirs, it may not be possible to design an intake structure that will never result in an alteration of a thermal stratification. Considering the lack of biological activity below any "natural thermal stratification", avoiding that zone may actually increase the number of aquatic organisms that may be impinged or entrained.

For the reasons described above, TXU believes EPA's proposed "no alteration of natural thermal stratification" standard for new CWISs in lakes and reservoirs should be abandoned because it is ill-

founded, impossible to implement, and based on a significant error in understanding of the biology associated with stratification.

EPA Response

See response to comment 316bNFR.049.004.

Comment ID 316bNFR.017.008

Subject Matter Code 125.84.2

Compliance in Lake

Author Name Paul L. Zweiacker

Organization TXU Business Services O-B-O TXU Generation

Location of Cooling Water Intake Structure - §125.84(c)(1-2)

For the reasons already described in the previous comments on the definitions of Littoral Zone, Design Intake Velocity, and Natural Thermal Stratification, TXU believes that a case-by-case evaluation of a CWIS location and possible impacts, as opposed to mandatory uniform national requirements, would be a more justifiable, appropriate, and fiscally sound approach for regulating impingement and entrainment.

TXU is also very concerned over the Agency's narrow view on possible site locations for a CWIS. Based on the discussion provided in the preamble, it appears that the Agency contends that the only way to protect a littoral zone is by constructing a CWIS some distance away from the shoreline, into the waterbody. EPA fails to consider options that could allow a shoreline, or recessed, CWIS that could be constructed without a close proximity to a littoral zone. If the area selected, or constructed, is large enough and does not have the slope, substrate, or other qualities that could support submerged aquatic vegetation, then it would not present an increased threat.

EPA Response

EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. EPA also understands that with the approach of the rule, some locations may be restricted. However, owners and operators of new facilities have more flexibility in designing facilities that can meet the requirements of today's rule in a cost-effective manner.

Although EPA recognizes that the location of a cooling water intake structure is a factor that affects the environmental impact caused by the intake structure, today's final rule, apart from the proportional flow requirements, does not include specific national requirements for new facilities based on location of the cooling water intake structure. After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain

design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches, including moving the location of the intake structure. However, owners and operators of new facilities have more flexibility in designing facilities that can meet the requirements of today's rule.

Comment ID 316bNFR.017.009

Subject Matter Code 125.84.2

Compliance in Lake

Author Name Paul L. Zweiacker

Organization TXU Business Services O-B-O TXU Generation

§125.84(c)(2)(iii): The requirement to reduce intake flow to a level commensurate to that of a closed-cycle recirculating system is shortsighted and unduly onerous. It fails to recognize pool level fluctuations, which would naturally increase flow during high water periods or the physics of a once-through cooling water system. Most closed-cycle systems result in a higher rate of water consumption through evaporative loss, and they also produce wastewater streams such as blowdown. Once-through systems, on the other hand, have a comparatively low consumption and do not produce other wastewaters. In Texas, and the southwest, water conservation is imperative.

EPA Response

EPA has determined that, at a national level, the best technology available for minimizing adverse environmental impact from entrainment is by reducing intake flow to levels commensurate with closed-cycle recirculating systems. EPA recognizes that there is some evaporative loss and wastewater generation but believes that the benefits derived from reducing intake flows outweigh the negative aspects. Additionally, new facilities are required to minimize make-up and blowdown flows, thereby minimizing the impacts associated with those flows and increasing the efficiency of the facility. See Section V.A. in the preamble to today's rule.

If there are local issues associated with the permitting, such as water conservation, the applicant may follow Track II and demonstrate reductions in impingement and entrainment to the same level that would be achieved under Track I.

Comment ID 316bNFR.017.010

Subject Matter Code 125.84.2

Compliance in Lake

Author Name Paul L. Zweiacker

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§125.84(c)(2)(iv): A requirement to implement additional design and construction technologies is very shortsighted, inflexible, and quite possibly unnecessary. It fails to even consider that in certain situations, additional technologies may not be needed. In those cases, this requirement would only result in significantly increased cost with no, or tenuous, environmental benefit.

EPA Response

EPA is not mandating any specific design and construction technologies and is adopting a site-specific approach where facilities have the flexibility to propose technological solutions appropriate for their site conditions where additional controls are needed. The final rule requires facilities withdrawing more than 10 MGD choosing Track I to select and install additional design and construction technologies if they locate in certain areas where fish or shellfish resources need additional protection. See § 125.84(b)(4) and (5). Facilities withdrawing between 2 and 10 MGD can choose to follow the Track I requirements of § 125.84(c) but, if they do, they must select and install design and construction technologies at all locations. See § 125.84(c)(3). Facilities that choose to follow Track II must install design and construction technologies only in certain areas. See § 128.84(d)(4) and (5).

Comment ID 316bNFR.017.011

Subject Matter Code	125.86
Information to Collect	

Author Name Paul L. Zweiacker

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National Pollutant Discharge Elimination System (NPDES) Permit Information - §125.86(a-b)

Source Water Baseline Biological Characterization: These requirements fail to consider several important factors or scenarios. What if the reservoir is not yet constructed, how would this characterization be conducted? Although some general concepts and expected physical characteristics can be projected or pulled from the literature on similar reservoirs, it would certainly not address many of the details specified.

There is also the question of the reservoir's maturation. The biological and physical characteristics of a newly inundated reservoir is extremely dynamic. The initial characteristics cannot be used to project those same characteristics once its flora and fauna more fully matures. In Texas, the maturation process is slow, often requiring at least ten years or more before the biological communities achieve a somewhat stable relationship. Many of the fish species found in the first several years will not be present in year 10, and many of the plant species found in year 10 were not present in the first several years. As a result, a true sustainable littoral zone will often not develop until late in the process.

In both instances discussed above, the required baseline monitoring would either be impossible or of little real use. Delaying the construction of a facility until the reservoir has been constructed and has reasonably matured would be fiscally unacceptable.

EPA Response

Impacts from impoundment structures are addressed under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

EPA has modified the Source Water Baseline Biological Characterization requirements in the rule to allow the use of existing data for both permit issuance and reissuance. For the final rule, Track I does not require baseline biological characterization monitoring. Rather, it requires the applicant to gather and present historical and/or literature to support/justify the design and construction technologies the applicant chose to implement at the new facility. The changes over time (mentioned by the commenter) will be addressed as subsequent NPDES permits (i.e., permit renewal) is considered. That is, the rule states that for each subsequent permit, the Director must determine whether additional requirements for design and construction technologies should be included in the permit (e.g., if the performance of the technologies is found to be insufficient to minimize impingement and entrainment).

Where a reservoir is not yet constructed, the facility would first seek 404 approval, which normally requires characterization of the project and affect waters. This data could then be used by the facility in applying for a NPDES permit for the CWIS and any discharge.

Comment ID 316bNFR.017.012

Subject Matter Code	125.87
	Monitoring

Author Name Paul L. Zweiacker

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§125.87(a)(1-2) Biological Monitoring: The post operational monitoring proposed in this section is unnecessarily onerous and inappropriate in the cost, frequency, scope, documentation, and manpower requirements. The projected cost offered by the Agency is grossly underestimated, possibly by an order of magnitude. It appears that the Agency failed to recognize the complexity of the biological monitoring and the highly specialized equipment, personnel, and supporting biological expertise needed to accomplish the described task.

There are also other flaws. Although the proposed rules offer the possibility that the biological monitoring frequency can be reduced after two years, the method identified to obtain permission to reduce monitoring is cumbersome at best. Evaluation and preparation of the data collected during each biological monitoring effort will not be immediate, and in most cases will take several months. Then, only after two years of data has been assembled, evaluated, and prepared, can the permittee request a reduction in frequency. The Director then must consider the data and respond to the request (note: there is no time requirements imposed on the Director). During this period, the permittee must continue the initial biological sampling frequency until the Director responds. Given the probable time involved in this process, even if the Director responds favorably, the permittee has been forced to continue the burdensome task and cost of biological monitoring well beyond the initial two-year period.

Additionally, the frequency identified for the biological testing is too prescriptive, and in fact, may not be possible. The proposed sampling frequency fails to consider a number of factors. First, as previously discussed in the case of a new reservoir, this sampling would be of little use or value. Second, EPA fails to consider the operation of the CWIS. Depending on the size and type of generating unit the intake structure is supporting, the CWIS may not operate every month or it may not operate a sufficient period of time during a month to support the sampling requirements. There may also be periods when the CWIS, and the associated unit, does not operate, or does not operate at full capacity, due to unforeseen mechanical problems.

Third, the complexity and logistics of these types of sampling events is often tremendous, requiring a great deal of preparation and planning. Any unforeseen circumstances, involving either CWIS operational/mechanical problems, sampling equipment failures, or unsafe weather conditions could delay or abort the sampling event. For these, as well as other reasons, a strict monthly and bi-monthly sampling requirement is not realistic, workable, or necessary.

EPA Response

EPA has revisited and revised the cost estimates for monitoring based on revisions to the final rule, and those costs are documented for the record in the NODA. EPA does not believe that the method identified to obtain permission to reduce the biological monitoring frequency after 2 years is

"cumbersome at best." EPA believes that at least 2 years of data are required to show that the technologies are consistently performing as projected under all operating and environmental conditions.

In response to the comment that "EPA fails to consider the operation of the CWIS...the CWIS may not operate every month or it may not operate a sufficient period of time during a month to support the sampling requirements. There may also be periods when the CWIS...does not operate, or does not operate at full capacity, due to unforeseen mechanical problems", EPA have proposed that the facility would be required to conduct impingement and entrainment sampling over a 24-hour period no less than once per month only when the cooling water intake structure is in operation. EPA believes the frequency identified for the biological monitoring is indeed possible and is not too prescriptive.

EPA disagrees with the commenter that "a strict monthly and bi-monthly sampling requirement is not realistic, workable, or necessary." EPA believes that a monthly and bi-monthly sampling requirement is indeed workable and necessary to show that the technologies are consistently performing as projected. Furthermore, while EPA acknowledges that biological monitoring requires a good deal of planning and preparation, the claim that the "complexity and logistics of these types of sampling events is often tremendous, requiring a great deal of preparation and planning" is not true in this the case. EPA will address many of these concerns by providing monitoring guidance.

Comment ID 316bNFR.017.013

Author Name	Paul L. Zweiacker
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Subject Matter Code 125.87

Monitoring

§125.87(b) Velocity Monitoring: The required velocity monitoring also presents a number of problems. Foremost is the requirement that "the head loss across the intake screen must be measured at minimum ambient source water surface elevation." As previously described, Texas reservoir elevations can vary greatly and often because of unpredictable and uncontrollable factors. In most cases, it will not be possible to recognize or insure that the source water surface elevation measured is ever the true minimum. The problems identified in the previous discussion of CWIS operation, or operation at a reduced capacity also applies here, even for quarterly monitoring.

EPA Response

EPA recognizes that in certain circumstances it may not always be possible to recognize or insure that the source water surface elevation measured is the true minimum. Therefore, Under § 125.87(b), Track I facilities are required to monitor the head loss across the intake screens to obtain a correlation of those values with the design intake velocity (Track I) or other specified velocity (Track II) at minimum ambient source-water surface elevation (according to best professional judgment based on available hydrological data).

The Agency considers this the most appropriate parameter to monitor, because, although the facility might be designed to meet the requirement, proper operation and maintenance is necessary to maintain the open area of the screen and intake structure, ensuring that the design intake velocity is maintained. Head loss can easily be monitored by measuring and comparing the height of the water in front of and behind the screen or other technology.

Comment ID 316bNFR.017.014

Subject Matter Code 125.87

Monitoring

Author Name Paul L. Zweiacker

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§125.87(c) Visual Inspections: The requirement for weekly visual inspections to ensure that the various technologies are operating and functional implies a dramatic effect on operation of the CWIS and the associated generating unit(s). Not all technologies must or should be operated continuously, and occasionally some technologies may not operate due to mechanical problems. Depending on the specific situation, it is not necessary or reasonable to suggest that all technologies should be available or operating continuously, and that periodic outages of various technologies is not acceptable.

The proposed frequency of inspections (i.e., weekly) is excessive and burdensome. With advances in electronics and computers, remote monitoring will be available for practically every situation, making frequent documented visual inspections unnecessary. Also, as discussed several times in the preamble, depending on the waterbody type, location, etc., impingement and entrainment are typically not a fifty-two week per year concern.

EPA Response

? EPA does not believe that the proposed frequency of inspections (i.e., weekly) is excessive and/or burdensome. Weekly visual or remote inspections are required to provide a mechanism for both the new
facility and the Director to ensure that any technologies that have been implemented for minimizing adverse environmental impact are being maintained and operated in a manner that ensures that they function as designed. The Director would determine the actual scope and implementation of the visual inspections based on the types of technologies installed at your facility. For example, inspections could be as simple as observing bypass and other fish handling systems to ensure that debris has not clogged the system and rendered it inoperable.

Comment ID 316bNFR.017.015

Author Name	Paul L. Zweiacker
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Subject Matter Code 125.88

Records and Reporting

Recordkeeping and Reporting - §125.88(b)(1-3)

The requirement to submit the records of biological monitoring, velocity and head loss monitoring, and visual inspections, is excessive and also has many hidden problems. The submittal of the actual records is an unusual permit requirement and of questionable value. The sheer volume of the records created to document these requirements for one CWIS will be huge, and unless the Agency mandates the format, will vary greatly from facility to facility. These records, as with other similar permit related monitoring programs, should be maintained and available for review upon request by the Director (see §125.88(a)). If this information must be submitted, then a summary report that includes data on each of these monitoring requirements would be a much simpler, efficient, and relevant method.

EPA Response

EPA requires this information in order to allow permit writers full access to information pertinent to the permit, especially in evaluating the potential need for more stringent requirements at the facility. EPA also believes that the volume of required information is small and does not impose an inappropriate burden upon either the applicant or the permitting authority. The format of these records is flexible and will be determined on a case-by-case basis by the permitting authority.

Comment ID 316bNFR.017.016

Author Name	Paul L. Zweiacker
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Subject Matter Code 10.01

Regulatory Framework Options

TXU's experience and knowledge of Texas reservoirs show that a highly prescriptive program utilizing a set of national criteria is not necessary, appropriate, or workable for our region. While any benefits would be negligible, the costs would be staggering. In addition, many of the siting/operational requirements, and the assumptions on which they are based, have been shown to be faulty, unfounded, or incorrect.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

Comment ID 316bNFR.017.017

Author Name	Paul L. Zweiacker
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Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

The same knowledge and experience also shows that such a regulatory program must consider the unique physical conditions and biology of each waterbody, as well as other factors such as location, climate, cost, etc. TXU believes that EPA should reconsider its entire approach, and in light of the information provided in these comments, develop a more flexible, workable, site-specific, and cost-effect methodology. Any new approach should provide the regulated community the opportunity to either meet a set of conservative measures or show that because of the site-specific circumstance, their CWIS design and location will be protective and minimize any impacts.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Brett J. Marshall

On Behalf Of:

Dynegy Midwest Generation, Inc.

Author ID Number:

316bNFR.018

Comment ID 316bNFR.018.001

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Brett J. Marshall

Organization Dynegy Midwest Generation, Inc.

Need To Preserve Site-Specific Evaluations

Despite the fact that EPA has not defined adverse environmental impact (AEI), they have assumed that a single, simplistic national standard is necessary to prevent AEI. During the last thirty years, many 316(b) determinations have been performed and the results were reviewed by EPA, or by States with delegated authority. Each of these studies was site specific and the decisions to approve the studies were made on a case-by-case basis. Despite claims that the 316(b) process is broken, many fisheries in the Midwest have continued to improve even without making any modifications to the existing intake structures. A single technology for all facilities would be overly protective and ignores site specific conditions such as substrate, depth, flow, water quality, and plant operating conditions. Facilities located on large river systems such as the Mississippi and the Ohio should not be held to the same standard as those located in estuaries. EPA recognizes this and proposes to perform some case studies on large river systems in early 2001. The ability to make site-specific demonstrations must be preserved, even if it requires more comprehensive engineering studies and biological evaluations.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.018.002

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name Brett J. Marshall

Organization Dynegy Midwest Generation, Inc.

Limits on Intake Volume are Inappropriate

EPA assumes that large water withdrawals necessarily cause an environmental impact. Over the years, many power plants have been constructed with cooling ponds and cooling lakes providing the source of cooling water. The fisheries within these waterbodies are often managed by the State's Department of Natural Resources and are usually touted as some of the best fishing lakes in the state. With these kinds of claims from state agencies, it's inappropriate for EPA to claim that large water withdrawals harm the fish population. Is EPA recommending that cooling ponds and cooling lakes no longer be constructed? Without these waterbodies, many excellent fisheries, which provide quality recreation, would not be available to the public and the revenue associated with the activity would disappear.

EPA Response

EPA supports the use of recirculating cooling systems such as those employing cooling lakes and ponds and believes these systems can meet the requirements of today's final rule. In addition to effectively reducing cooling water intake flow, these technologies provide recreational and economic benefits to the general public. Proper management of these resources ensures the needs of both the public and the facility will continue to be met. EPA believes the standards for water withdrawal from lakes and ponds (see Section VI.D) are additional tools that will help balance the needs of aquatic environments, industry, and the general public.

Without additional information regarding the many cooling lakes and cooling ponds the commenter mentions, EPA cannot assess what level of adverse environmental impact, if any, is occurring. EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.)

Comment ID 316bNFR.018.003

Subject Matter Code	10.011
River/Stream--Proposed Standards	

Author Name Brett J. Marshall

Organization Dynegy Midwest Generation, Inc.

Flow Limits for Rivers are Inappropriate

For freshwater rivers and streams, EPA proposes that intake flow be no more than the lower of 5 percent of the source waterbody mean annual flow or 25 percent of the 7Q10. EPA need only look at fish communities near facilities that take in relatively high percentages of river flow to determine if there is any impairment. Many facilities located on smaller rivers and streams have agreements with state agencies to curtail water withdrawals when the river reaches a certain level. This insures adequate water levels for recreational uses such as boating and fishing. Facilities located on these smaller rivers and streams often pump water to a makeup water reservoir or a cooling pond. EPA's flow limits do not take into account the site-specific operations such as managing water levels in reservoirs and ponds so that no water withdrawals need occur during periods of low-flow. New facilities could still be constructed on smaller rivers and streams as long as appropriate water withdrawal agreements and water management plans are in place.

EPA Response

In the final rule EPA requires that for cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow. The “or 25 percent of the 7Q10" option has been removed. EPA has dropped the 7Q10 requirement from today's final rule because it believes that the requirement limiting design intake capacity to 5 percent of the mean annual flow of the source water (for freshwater streams and rivers) achieves an acceptable level of protection for the source waterbody and is generally achievable by the industry as a whole.

EPA examined the performance of existing facilities based on section 308 questionnaire data in terms of proportional flow in order to determine what additional value could be used as a safeguard to protect source waters against entrainment, especially in smaller waterbodies or in waterbodies where the intake is disproportionately large as compared to the source water body. EPA finds that the proportional flow limitations for freshwater rivers and streams are appropriate - they are technically available and economically practicable for the industry as a whole.

Establishing proportional flow limits as a performance standard allows and encourages facilities to consider site-specific conditions to manage the intake withdrawals during low-flow periods to meet the requirements of Section 125.84.

Comment ID 316bNFR.018.004

Subject Matter Code	7.3

Definition: Waters of the US

Author Name Brett J. Marshall

Organization Dynegy Midwest Generation, Inc.

Flow Limits for Lakes and Reservoirs are Inappropriate

EPA proposes to limit new facilities design so as to not alter the thermal structure of the lake or reservoir. The purpose of constructing a cooling lake or reservoir is to provide cooling, not to provide makeup water to cooling towers. To meet this requirement, a cooling water reservoir or lake would have to be greatly oversized, and costs would be prohibitive. Again, is it EPA's intent to prohibit the construction of cooling water reservoirs and lakes? EPA does not provide information regarding the severity of impacts to the biological community when the thermal stratification is altered.

EPA Response

It is not EPA's intent to prohibit the construction of cooling water reservoirs or lakes. Under the final new facility rule, cooling ponds (or cooling reservoirs or lakes) can be part of a closed-cycle recirculating system. See 40 CFR 125.83, definition of "closed cycle recirculating system." However, in certain circumstances cooling ponds can be "waters of the U.S." See 40 CFR 122.2. This determination is made on a case-by-case basis. Therefore, the applicability of this rule to any new facility, and in particular the cooling pond at that new facility, must be determined by the permitting authority. See Response to Comment 316b.NFR.068.151.

Comment ID 316bNFR.018.005

Subject Matter Code	10.04
Site-specific Permit Flexibility	

Author Name Brett J. Marshall

Organization Dynegy Midwest Generation, Inc.

EPA's Single Velocity Requirement Not Relevant

EPA proposes a single velocity value of 0.5 ft/sec for all cooling water intakes, regardless of whether they are located on estuaries, rivers, streams, or oceans. Once again, this approach eliminates site-specific conditions and facility operations. Currently, existing cooling water intakes have a wide range of intake velocities and EPA need only examine fisheries data collected near an existing cooling water intake to determine whether there has been any impact to the aquatic community. Many factors other than velocity influence impingement rates such as intake configuration, water temperature, river stage, fish species, and age. Most impingement is correlated more closely with intake river temperature than intake velocity.

EPA Response

As documented by the data collected for the NODA, EPA believes the 0.5 ft/s requirement is scientifically based, technically sound, protective of aquatic resources, and technically available and economically practicable as demonstrated by the fact that it is frequently achieved at recently built facilities. The requirement is well supported by existing literature on fish swim speeds and will also serve as an appropriate protective measure, since the data suggest that a 0.5 ft/s intake velocity would protect 96 percent of the tested fish. EPA notes that if the permit applicant does not want to meet the specific Track I velocity requirement, the applicant can, under Track II, conduct site-specific studies and seek to demonstrate equivalent protection from impingement and entrainment. This may allow facilities to install cooling water intake structures with greater that 0.5 ft/s velocities if they can demonstrate that they would have the same reduction of impingement and entrainment as Track I standards which include the 0.5 ft/s limitation on velocity. EPA notes that more than 70 percent of the manufacturing facilities and 60 percent of the electricity generating facilities built in the past 15 years have met this requirement and believes the requirement is an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. Additionally, past permitting decisions were made using the best judgment at the time of the decision. These permitting decisions should not be interpreted to signify best technology available in future decisions.

While EPA acknowledges that multiple factors may affect impingement and entrainment at a given intake, EPA believes that there is ample evidence contained in the record to support a correlation between velocity and/or flow and impingement and entrainment. As stated in the preamble to the rule, intake velocity is one of the key factors affecting the impingement of fish and other aquatic biota. The velocity of water entering a cooling water intake structure exerts a direct physical force against which fish and other organisms must act to avoid impingement and entrainment. The compilation of swim speed data (DCN #2-029 in the record of the rule) demonstrates that many fish species are potentially unable to escape the intake flow and avoid being impinged. The record also supports the proposition that flow is related to entrainment.

Comment ID 316bNFR.018.006

Subject Matter Code 7.4

Water Withdrawal threshold

Author Name Brett J. Marshall

Organization Dynegy Midwest Generation, Inc.

EPA's Two MGD Threshold is Too Low

This arbitrary threshold is much lower than it should be and will require the permitting agencies to include very small facilities in this rule, when their time would be better spent on larger facilities. A threshold value of 25-30 MGD would be more reasonable and represents an order of magnitude reduction in water withdrawals compared to existing cooling water intakes. If existing cooling water intakes on large river systems haven't adversely impacted the aquatic community, then a 25-30 MGD threshold value can be considered overly protective.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.018.007

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Brett J. Marshall

Organization Dynegy Midwest Generation, Inc.

Conclusion

This rule should allow a company planning to construct a new cooling water intake to meet certain specified conservative criteria and be able to expedite regulatory review. For those facilities where the conservative criteria is not feasible and they are willing to perform the necessary studies to show minimal or no adverse impact they should be able to make that site-specific determination. No single parameter can predict environmental impact.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

John H. Dunnigan

On Behalf Of:

Atlantic States Marine Fisheries

Author ID Number:

316bNFR.019

Comment ID 316bNFR.019.001

Subject Matter Code 9.3

Documentation of I & E Impacts

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

The fifteen Atlantic Coastal States working cooperatively through the Commission collectively manage many of the coastal fishery resources in state waters along the Atlantic coast. Many of these species, including striped bass, sturgeon, shad and river herring, are anadromous and rely heavily on rivers and estuaries along the Atlantic Coast. The Commission is concerned about the effects of water impingement and entrainment from cooling water intake structures on our managed species.

EPA Response

EPA agrees with the commenter that cooling water intake structures do pose a threat to some fishery stocks and through this rule is seeking to minimize that threat. See section VI.B of the Preamble for additional discussion.

Comment ID 316bNFR.019.002

Subject Matter Code 10.01

Regulatory Framework Options

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

The Commission strongly supports the EPA's decision to establish consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities. This will remove the uncertainty in the existing case-by-case basis approach while still allowing the state permitting authorities to provide additional site-specific measures when the resource requires them.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.019.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

In many specific instances throughout the rule, the EPA has outlined a range of alternatives it may include in the final rule. The level of protection afforded by one end of the range as compared to the other end of the range is extreme. Because of these different options, it is difficult to determine which level of protection the EPA will choose. We encourage the EPA to choose the options throughout the rule that provide the most protection for the natural resource.

EPA Response

The final rule establishes technology-based performance requirements that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. With respect to new facilities, the technologies used as the basis for this rule are commercially available and economically practicable for the industries affected as a whole, and achieve significant reduction in impingement and entrainment. EPA believes that it has chosen the best option that will provide the most protection of natural resource for the most practicable cost.

Comment ID 316bNFR.019.004

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

Subject Matter Code 7.1

Definition: New Facility

The Commission is concerned that the facilities which are required to follow Section 316(b) regulations as outlined in the proposed regulation may not be all of the appropriate facilities. Because the current definition of “new facilities" would allow the almost complete destruction and then rebuilding of an old facility without having to follow these guidelines, the opportunity to require facilities going through a major retrofit to follow these regulations would be lost. In addition, by only requiring facilities, which have NPDES permits to comply with these Section 316(b) regulations, the Commission feels that the EPA may be leaving some key facilities out.

EPA Response

In this rule EPA has defined a new facility in a manner consistent with existing NPDES regulations, with a limited exception. In addition to meeting the definition of a new source, the final rule requires that a new facility have a new cooling water intake structure or use an existing intake structure that has been modified to increase the design capacity. Thus, it might be possible to completely demolish an existing source, replace it with a stand-alone facility with a smaller or equal capacity cooling water intake structure, and not be regulated under the final rule as a new facility. EPA deferred the regulation of such entities from the Phase I rule because it was limited in terms of the types of data it had to complete the Phase I rulemaking. Therefore, regulation of such facilities will await EPA's analysis of existing facilities based on the detailed questionnaire for existing facilities. This facility would then be an existing facility and as such the requirements applicable to such a facility will be addressed in future rulemakings (i.e., Phase II and III).

Comment ID 316bNFR.019.005

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

The Commission encourages the EPA to define "adverse environmental impact." The third definition the EPA listed, defining this term as impingement and entrainment, is the most appropriate. This would provide guidance to the state permitting authorities for additional measures that may be necessary due to case specific instances.

EPA Response

See response to comment 316bNFR.529.005.

Comment ID 316bNFR.019.006

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

The Commission is concerned with the EPA ' s restoration proposal. The Commission urges the EPA to require both avoidance and mitigation measures before restoration measures are taken. Restoration should not be an acceptable alternative to best technology available for the cooling water intake facilities.

EPA Response

See sections V.B.2.f and VI.L for further discussions on restoration measures in today's rule and 316bNFR.210.021.

Comment ID 316bNFR.019.007

Subject Matter Code 10.04

Site-specific Permit Flexibility

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

The proposed rule does not adequately address the issue of cumulative impacts of cooling water intake facilities. In many areas, there are multiple facilities withdrawing water from the same or contiguous water bodies and we believe that these impacts should be taken into account in these regulations.

EPA Response

In addition to impingement and entrainment losses associated with the operation of the cooling water intake structure, EPA is concerned about the cumulative overall degradation of the aquatic environment as a consequence of (1) multiple intake structures operating in the same watershed or in the same or nearby reaches and (2) intakes located within or adjacent to an impaired waterbody. These concerns are addressed in the final version of the regulation.

Both the permitee and the permitting authority have requirements specified in the regulation. Section 125.84 (d) states that " You (the permitee) must comply with any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure or monitoring requirements at a new facility that the Director deems are reasonably necessary to comply with any provision of state law, including compliance with applicable state water quality standards (including designated uses, criteria, and antidegradation requirements). The requirements of the permitting authority are further stated in Section 125.89 (a)(2): For each subsequent permit renewal, the Director must review the application materials and monitoring data to determine whether additional requirements for design and construction technologies should be included in the permit if they are reasonably necessary to minimize impingement and entrainment as a result of the effects of multiple cooling water intake structures in the same body of water; seasonal variations in the aquatic environment affected by the cooling water intake structures controlled by the permit; or the presence of a regionally important species or threatened or endangered species.

Comment ID 316bNFR.019.008

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The EPA should consider requiring dry condenser cooling as the best technology available for all new facilities. Alternative technologies, which result in killing as few or fewer fish, shellfish and wildlife as this technology, would meet this standard as well.

EPA Response

EPA did not adopt dry cooling as the technology-basis for the requirements of the rule for the reasons discussed in Section V.C of the preamble to the final rule. However, new facilities employing dry cooling will qualify for the fast track permitting under the rule. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Comment ID 316bNFR.019.009

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name John H. Dunnigan

Organization Atlantic States Marine Fisheries

The Commission also supports the EPA's decision to provide greater protection for water bodies with greater biological productivity but recommends that the regulations include stringent standards to protect waters outside the littoral zone as per the EPA's antidegredation policy.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jeffrey S. Lynn

On Behalf Of:

International Paper

Author ID Number:

316bNFR.020

Note

Fully supports and incorporates by reference the comments of AF&PA (316bNFR.062)

Comment ID 316bNFR.020.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Jeffrey S. Lynn

Organization International Paper

International Paper supports EPA's decision to develop cooling water intake rules independently for new and existing facilities. Whereas a company constructing a new facility may have some flexibility to factor tighter cooling water intake rules into the selection process for locating "new" industrial complexes, this same flexibility is not available for existing facilities as their capital infrastructure is already in place. Thus, it is wholly appropriate for EPA to regulate new and existing cooling water intakes separately. EPA's decision to differentiate between new and existing cooling water intakes represents a further acknowledgment of the significant differences between existing and "Greenfield" facilities and the need for separate rules.

EPA Response

See response to comment 316bNFR.012.003 and the preamble to today's rule, including the discussion of "greenfield[s]".

Comment ID 316bNFR.020.002

Author Name Jeffrey S. Lynn

Organization International Paper

Subject Matter Code 7.4

Water Withdrawal threshold

The concept of a threshold triggering the applicability of proposed requirements is also supported. It is appropriate for EPA to include an applicability threshold for this rule to avoid unnecessary regulation of intake structures with little or no potential for adverse environmental impact (AEI). However, EPA's proposed 2 MGD threshold is too restrictive and is further discussed below in these comments.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.020.003

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Jeffrey S. Lynn

Organization International Paper

EPA Should Set a Higher Threshold for Application of the Section 316(b) Rules

Cooling water intake structures have been in use for decades. To date, the experience from these thousands of existing cooling water intakes has yielded little evidence supporting widespread adverse environmental impacts (AEI). Adverse impacts that have been associated with intake structures are generally large-volume intakes located near sensitive aquatic habitats. This lack of adverse impact for cooling water intakes is commonplace and supports raising the applicability threshold to better focus scant EPA and State resources on regulating intake structures that may create environmental concerns.

EPA, in the preamble to the proposed rule, seeks comments on several specific volumetric thresholds up to 30 MGD that would trigger the applicability of the proposed rule. In response, International Paper would support setting a much higher and more reasonable threshold than the preferred 2 MGD threshold proposed by EPA. EPA 's preferred 2 MGD threshold incorporates 99.97 % of all existing cooling water intake flows. This trigger value is far too restrictive and incorporates' far too many intakes that do not exhibit adverse environmental impacts. As discussed above, this lack of widespread AEI from existing intake structures suggests that applicability thresholds could be much higher than 2 MGD and still be environmentally protective over a wide range of hydrologic and environmental conditions found at today's intakes. Historically International Paper has not experienced significant adverse environmental impacts at its cooling water intakes even when operating at intake volumes above 30 MGD, EPA's highest volumetric threshold for which comments are sought. International Paper encourages EPA to set a threshold that will maintain the environmental protections required under Section 316(b) while minimizing the unnecessary regulation of intakes with little or no environmental impact.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 15

MGD, 32 percent of the manufacturers, 29 percent of the nonutilities, and 50 percent of the utilities would be covered, as would 97.3 percent of the total flow. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. While at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.020.004

Subject Matter Code 7.1

Definition: New Facility

Author Name Jeffrey S. Lynn

Organization International Paper

EPA Should Further Clarify the Definition of a New Facility

International Paper supports EPA's approach to separate and regulate new and existing facility cooling water intakes. It is appropriate to limit the application of the Section 316(b) new source standards to "Greenfield" and "stand-alone" operations. However, to avoid any potential ambiguity EPA should clarify the rule language when defining a new facility. Examples given in the preamble (p.49066) provide this needed clarity and they should be incorporated into the rule.

EPA Response

EPA has clarified the definition of new facility to include greenfield and stand-alone facilities, and has described each in the definition. In addition, EPA has added some examples to the regulatory language of the rule to clarify the definition of new facility under this final rule. These examples, as well as the rule and the preamble discussion, clarify the applicability of the rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jeff A. Brediger

On Behalf Of:

City of Orrville Dept. of Public Util.

Author ID Number:

316bNFR.021

Note

No comments were coded for this letter. The author fully supports the comments made by APPA (316bNFR.043)

Comment ID 316bNFR.021.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Jeff A. Brediger

Organization City of Orrville Dept. of Public Util.

No comments were coded for this letter. The authors support APPA's comments.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kent Satterlee

On Behalf Of:

Offshore Operators Committee

Author ID Number:

316bNFR.022

Note

Fully supports the comments made by API (316bNFR.028) and IADC (316bNFR.004)

Comment ID 316bNFR.022.001

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

The OOC opposes the cooling water intake rule as currently proposed. As pointed out in our comments, the proposed rule did not consider offshore oil and gas facilities in its cost/benefit analysis, and the economic impact could be large.

EPA Response

EPA did not consider offshore and coastal oil and gas extraction facilities in its analyses for the proposed rule. EPA is investigating various options for these CWIS and will present the associated costs, benefits, and economic impacts in the upcoming Phase III 316(b) rule.

Comment ID 316bNFR.022.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

EPA did not consider the impact to existing mobile drilling units which could be considered new sources when drilling development wells.

EPA Response

EPA did not consider offshore and coastal oil and gas extraction facilities in its analyses for the proposed rule. EPA is investigating various options for all offshore and coastal oil and gas extraction facilities (both those considered new sources and existing sources under 40 CFR 435) and will present the associated costs, benefits, and economic impacts in the upcoming Phase III 316(b) rule.

Comment ID 316bNFR.022.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

Scope and Applicability of Proposed Rule

The proposed rule § 125.81 defines the applicability to new facilities subject to an NPDES permit which propose to use a cooling water intake structure with a design intake flow of greater than two (2) million gallons per day (MOD). Additionally, the table at 65 FR 49061 lists oil and gas extraction (SIC Codes 1311, 1321) as entities potentially subject to the proposed rule. This criteria would subject a large number of offshore production platforms and mobile drilling units to the requirements of the proposed rule.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.022.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Kent Satterlee

Organization Offshore Operators Committee

EPA's regulatory authority for this rulemaking, Clean Water Act Section 3l6(b)<FN 3>, states that "best technology available" be defined by what would "minimize adverse environmental impact". However, EPA has not defined "adverse environmental impact" in the proposed rule. As such, it appears that EPA acted arbitrarily in defining best technology available. EPA references its May 1977 Draft Guidance for Evaluating the Adverse Impact of Cooling Water Structures on the Aquatic Environment and identifies entrainment and impingement as two primary ways that intake structures can cause adverse environmental impact. However, EPA did not establish any guidance or threshold values for what constitutes adverse environmental impact. OOC submits that before EPA can finalize this rule under Section 316(b) authority, it must provide guidance and threshold values for what would constitute adverse environmental impact in various water bodies (i.e., rivers, lakes, estuaries, coastal waters, and open ocean environments).

Footnotes

3 CW A Section 3l6(b) states:

Any standard established pursuant to section 30 1 of section 304 of this Act and applicable to a point source shall require that the location,

design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse

environmental impact.

EPA Response

Please see response to comment 316bNFR.802.013.

For the purposes of regulating new facilities, where our record shows economic impacts as a percentage of revenue are very low for almost all regulated facilities and we are interested in fast, straight-forward permitting even for Track II facilities, we have chosen to measure minimization of AEI by the (comparatively) easy metric, reduction of entrainment and impingement.

Comment ID 316bNFR.022.005

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

EPA did not include offshore oil and gas extraction facilities in its Cost/Benefit Analysis. According to records maintained by the Department of Interior's Mineral Management Service (MMS), current offshore activity in the Gulf of Mexico is illustrated in Table 1 below.

Water Depth (Meters)	Active Leases	Active Major Platforms
0-400	3,791	1,938
Over 400	3,709	14

Table 1

Based on a survey of offshore operators, it is estimated that at least 80% of the platforms in water depths greater than 400 meters and 5-10% of the platforms in water depths less than 400 meters have cooling water intake structures with design flow of greater than 2 MGD. Intake velocities range from 1 to 5 feet/second. As provided in the IADC comments, essentially all of the mobile drilling units (approximately 200 working in U.S. waters) have cooling water intake structures with design flow of greater than 2 MGD and could therefore be subject to the proposed requirements. Many of these intake structures are constructed as "sea chests" within the hull of the floating facility and would be very complex and costly to retrofit. The depth of the intake structures range from 20 to 280 feet water depth; therefore a retrofit intake structure to reduce the intake velocity would require costly underwater installation with its associated risk to diving personnel.

EPA Response

EPA did not consider offshore and coastal oil and gas extraction facilities in its analyses for the proposed rule. EPA is investigating various options for all offshore and coastal oil and gas extraction facilities (both those considered new sources and existing sources under 40 CFR 435) and will present the associated costs, benefits, and economic impacts in the upcoming Phase III 316(b) rule.

After consultation with the U.S. Coast Guard and U.S. Department of Interior's Minerals Management Service EPA agrees that significant costs could be incurred if operators attempt to modify these "sea chests." These potentially significant costs are due to the fact that the CWIS (sea chest) is fixed into the side of the hull. Any significant modifications to the hull will result in significant costs.

EPA does not concur with the commenter's statement that potential underwater retrofits will result in unreasonable increased risks to diving personnel.

Sea chests are typical CWIS for semi-submersibles and drill ships. Information from the U.S. Coast Guard indicates that when semi-submersibles are drilling their sea chests are 80 to 100 feet below the water surface and are less than 20 feet below water when the pontoons are raised for transit or

screen cleaning operations. Drill ships have their sea chests on the bottom of their hulls and are typically 20 to 40 feet below water at all times. Operators are also required by the U.S. Coast Guard to inspect sea chests twice in five years with at least one cleaning to prevent blockages of firewater lines.

The requirement to dry-dock U.S. Mobile Offshore Drilling Units (i.e., drill ships and semi-submersibles) and inspection of sea chests/ sea valves are found in 46 CFR 107.261, and 46 CFR 61.20-5. This requires dry-docking twice in 5 years and examination of sea chests once in 5 years, but if the unit is in an area of high marine growth or has had history of excessive marine growth at the sea chests the Coast guard inspector may require the sea chests to be cleaned twice in 5 years at every dry-docking.

EPA finds that operators with oversight from MMS can safely manage the risks associated with these regular cleanings and any potential underwater retrofit operations.

Comment ID 316bNFR.022.006

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

Environmental Impact Assessment of Proposed Rule

In Section VII of the proposed rule, EPA documents impacts from entrainment and impingement from cooling water intake structures where all but two of the intake water flows are greater than 100 MGD (65 FR 49073). The proposed rule does not specify at which intake structures impacts have been documented, and none of the documented cases were for intake structures in open ocean environments, such as would be the case with offshore platforms. OOC submits that it is premature to subject offshore facilities to the requirements of this rule, when there have been no documented impacts.

OOC has included with these written comments a video tape of three different cooling water intake structures described in Table 2 below.

Order on Tape	Facility/Rig	Intake Rate (MGD)	Intake Velocity (ft/s)	Intake Structure
1	Mississippi Canyon 807	6.3	2.9	18” diameter with 1” holes
2	Green Canyon 205	5.9	2.6	Vertical slots 1” x 6”
3	Green Canyon 237 – Falcon 100 Rig	*	*	*

* details to be provided

Table 2

As can be witnessed from these video recordings, no observable adverse environmental impacts occurred during the recordings. Fish can be observed swimming near and through the intake structures with no entrainment or impingement. We believe these are representative of the cooling water intake structures from offshore facilities.

EPA Response

EPA did not consider offshore and coastal oil and gas extraction facilities in its analyses for the proposed rule. EPA is investigating various options for all offshore and coastal oil and gas extraction facilities (both those considered new sources and existing sources under 40 CFR 435) and will consider these facilities in the upcoming Phase III 316(b) rule.

EPA will be using the commenter's video tape record and other sources of information in order to best describe and quantify the benefits for any potential Phase III requirements regarding offshore oil and gas extraction facilities.

Comment ID 316bNFR.022.007

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

EPA's Best Technology Available (BTA) requirement for a design intake velocity of 0.5 feet/second has not been demonstrated as necessary to minimize environmental impact. As can be observed from the video recordings, intake velocities of 2.9 feet/second do not show any observable adverse environmental impacts. Of high importance is the requirement to maintain a minimum intake velocity in the range of 2 to 5 feet/second to minimize fouling from marine growth. The depth of the intake structures range from 20 to 280 feet water depth; and, therefore, minimum intake velocity in the range of 2-5 feet/second should be maintained since the intake structures can not easily be cleaned of marine growth.

EPA Response

EPA will be using the commenter's video tape record and other sources of information in order to best describe and quantify the benefits for any potential Phase III requirements regarding offshore oil and gas extraction facilities.

Sea chests are typical CWIS for semi-submersibles and drill ships. Information from the U.S. Coast Guard indicates that when semi-submersibles are drilling their sea chests are 80 to 100 feet below the water surface and are less than 20 feet below water when the pontoons are raised for transit or screen cleaning operations. Drill ships have their sea chests on the bottom of their hulls and are typically 20 to 40 feet below water at all times. Operators are also required by the U.S. Coast Guard to inspect sea chests twice in five years with at least one cleaning to prevent blockages of firewater lines.

The requirement to dry-dock U.S. Mobile Offshore Drilling Units (i.e., drill ships and semi-submersibles) and inspection of sea chests/ sea valves are found in 46 CFR 107.261, and 46 CFR 61.20-5. This requires dry-docking twice in 5 years and examination of sea chests once in 5 years, but if the unit is in an area of high marine growth or has had history of excessive marine growth at the sea chests the Coast guard inspector may require the sea chests to be cleaned twice in 5 years at every dry-docking. EPA finds that operators can regularly clean these CWIS in accordance with USCG regulations.

The commenter asserts that operators must maintain a minimum intake velocity of 2 to 5 ft/sec in order to prevent biofouling of the offshore oil and gas extraction facility CWIS. EPA requested documentation from the commenter and other industry representatives regarding the relationship between marine growth (biofouling) and intake velocities [see March 21, 2001 memorandum from Carey Johnston (EPA) to Alan Spackman (IADC)]. IADC was unable to provide any authoritative information to support the assertion that a minimum intake velocity of 2 to 5 ft/sec is required in order to prevent biofouling of the offshore oil and gas extraction facility CWIS. IADC asserts that it is common marine engineering practice to maintain high velocities in the seachest to inhibit attachment of marine biofouling organisms.

The Offshore Operators Committee (OOC) and the National Oceans Industries Association (NOIA) also noted that the ASCE "Design of Water Intake Structures for Fish Protection" recommends an approach velocity in the range of 0.5 to 1 ft/s for fish protection and 1 ft/s for debris management but does not address biofouling specifically. OOC/NOIA were unable to find technical papers to support a higher intake velocity.

EPA was able to identify some of the major factors affecting marine growth on offshore structures. These factors include temperature, oxygen content, pH, current, turbidity, and light. (Construction of Marine and Offshore Structures by Ben C. Gerwick Jr., CRC Press). Moreover, operators are required to perform regular inspection and cleanings of these CWIS in accordance with USCG regulations. Additionally, EPA and IADC identified that there are a variety of specialty screens, coatings, or treatments to reduce biofouling. EPA has not yet identified any relationship between the intake velocity and biofouling of a offshore oil and gas extraction facility CWIS. However, EPA will be pursuing this and other matters related to the offshore oil and gas industry in the Phase III 316(b) regulation.

Comment ID 316bNFR.022.008

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

OOC recommends that EPA specifically exclude offshore oil and gas facilities and mobile drilling units from the applicability of this rule unless EPA can document any adverse environmental impacts from cooling water structures. Alternatively, EPA could set the applicability criteria at greater than 25 MGD design flow for intake structures in open ocean environments or set the BTA for open ocean environments at a minimum of 5 feet/second.

EPA Response

EPA did not consider offshore and coastal oil and gas extraction facilities in its analyses for the proposed rule. EPA is investigating various options for all offshore and coastal oil and gas extraction facilities (both those considered new sources and existing sources under 40 CFR 435) and will consider these
facilities in the upcoming Phase III 316(b) rule.

Comment ID 316bNFR.022.009

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

Although the proposed regulations address only new facilities, OOC believes many of the same assumptions will be used by EPA in the forthcoming regulations for existing facilities.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.022.010

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

The proposed requirements under § 125.86 of what an owner or operator must submit with a new or reissued NPDES permit (e.g., source water baseline biological characterization and intake structure flow and design specifics) do not fit the general permit protocol and would be counter to the underlying rationale and criteria for general permit coverage expressed in EPA regulations at 40 CFR 122.28 (a)<FN 1>. Offshore oil and gas extraction activities in the Gulf of Mexico are conducted under General NPDES Permits GMG290000, GMG280000, and LAG260000. Under these general permits, an offshore operator must submit a notice of intent (NOI) to be covered under the general permit for any new discharge. General Permit GMG290000 for the Western Portion of the OCS, which covers the vast majority of offshore facilities, provides permit coverage to a facility if the NOI is submitted at least fourteen days prior to the commencement of discharge. Because of the nature of offshore operations with frequently changing drilling schedules, any alteration of these notification requirements to satisfy the data submission requirements of the proposed rule would cause costly delays.<FN 2>

Footnotes

1 EPA uses five criteria: 1) substantially similar types of operations; 2) discharge the same types of wastes or use the same types of disposal practices; 3) require the same effluent limitations, operating conditions, or standards; 4) require the same or similar monitoring; 5) in the opinion of the Director are more appropriately controlled under a general permit than under individual permits.

2 Drilling rig rates range from $50,000 to $250,000 per day.

EPA Response

EPA did not consider offshore and coastal oil and gas extraction facilities in its analyses for the proposed rule. EPA is investigating various options for all offshore and coastal oil and gas extraction facilities (both those considered new sources and existing sources under 40 CFR 435) and will present the associated costs, benefits, and economic impacts in the upcoming Phase III 316(b) rule.

Comment ID 316bNFR.022.011

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

The mobile drilling units that are used to drill wells for offshore oil and gas extraction (currently over 200 being used in U.S. Waters) have cooling water requirements in excess of 2 MGD as explained in the comments submitted by IADC. Because of the definitions provided in the Effluent Limitation Guidelines for the Offshore Subcategory (40 CFR 435), these mobile drilling units could be considered new sources when drilling new development wells. The Guidelines state at 58 FR 12456, "Thus, development and production facilities at a new site would be new sources under the Offshore Guidelines."

EPA Response

EPA did not consider offshore and coastal oil and gas extraction facilities in its analyses for the proposed rule. EPA is investigating various options for all offshore and coastal oil and gas extraction facilities (both those considered new sources and existing sources under 40 CFR 435) and will consider these
facilities in the upcoming Phase III 316(b) rule.

Comment ID 316bNFR.022.012

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization Offshore Operators Committee

EPA's proposed rule for new sources could require existing mobile drilling units to retrofit cooling water intake structures to meet the proposed intake velocity of 0.5 feet/second. And since many of these cooling water intake structures are designed as "sea chests" in the hull of the vessel, retrofit would be very complex and costly.

EPA Response

See response to comment 316bNFR.022.005.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Charles C. Vaughn, Jr.

On Behalf Of:

The Dow Chemical Company

Author ID Number:

316bNFR.023

Note

Fully supports the comments made by ACC (316bNFR.035)

Comment ID 316bNFR.023.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Although the provisions of this proposed regulation will directly apply to new CWIS facilities, it is believed that many existing industrial facilities, which are regulated by NPDES permits, may also be adversely impacted by this proposed regulation.

EPA Response

Today's final rule applies to new greenfield (defined by example in section I of this preamble) and stand alone facilities that use cooling water intake structures to withdraw water from waters of the U.S. and that have or require a National Pollutant Discharge Elimination System (NPDES) permit issued under section 402 of the CWA. Existing facilities will be addressed in the next phase of this rulemaking. See today's preamble section I for discussions on the scope and applicability of today's final new facility rule.

Comment ID 316bNFR.023.002

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Dow supports EPA on its efforts to minimize adverse environmental impacts associated with the use of CWIS. However, Dow also believes that EPA should be flexible in allowing operators of CWIS to use various cost-effective alternatives, which minimize significant aquatic impacts from industrial operations.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.023.003

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name Charles C. Vaughn, Jr.
Organization The Dow Chemical Company

Although EPA endorses the use of cooling towers in this proposed regulation, it is a known fact that many industries have already connected once through cooling water flow systems to recirculating water flow from cooling towers. It is important that EPA not impose burdensome and unrealistic procedures on cooling water intake velocities as well as establishing certain limitations on the total volume of cooling water that can flow into a CWIS.

EPA Response

Today's final rule is applicable only to those facilities which meet the definition of "New Source" or "New Discharger" as discussed in Section I.A (see also, 40 CFR 122.2 and 122.29(b)(1), (2), and (4)). The standards finalized today will not impose any burden on facilities which are currently in operation or under construction.

EPA does not believe the requirements regarding intake velocities are unrealistic or overly burdensome. Under Track I, a facility would be required to design its cooling water intake structures with through-screen velocities no greater than 0.5 ft/s. An acceptable protection level (96%) is achieved for motile fish when intake velocities are reduced to this level. (See, 1-5003-PR, 1-5005-PR, 1-50020-PR, 2-028A-D and 2-029 in the docket.)

If a facility prefers, the compliance standards under Track II may be selected. Under Track II, a facility would be required to demonstrate an alternative means of achieving the levels of impingement and entrainment that would result from implementation of Track I. This alternative does not necessarily need to include an intake velocity of 0.5 ft/s, and may be a more viable option, both economically and operationally.

Preliminary data from EPA's 316(b) survey questionnaire indicates a majority of facilities constructed in the last 15 years meet or surpass the standard for intake velocity. Trends in the design and configuration of cooling water systems have reduced the need for high intake volumes and velocities by employing more efficient recirculating systems and improved screening technologies. This has largely occurred without measurable impact to facility operations.

EPA does believes the standards for intake capacity are technically available and economically achievable. Reducing intake to a proportional level of the source water body is an effective way to protect a large percentage of the aquatic community without adversely affecting facility operations. EPA believes that large, disproportionate intake flows do not represent best technology available for minimizing adverse environmental impact. By establishing a national technology-based standard, EPA is minimizing adverse environmental impact while reducing the implementation burdens which may result for both facility and permitting authority if a case-by-case approach were adopted.

Comment ID 316bNFR.023.004

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

EPA must also ensure that various new cooling water technologies do not increase fossil fuel use and air emissions, which will have a greater impact on the environment.

EPA Response

EPA has accounted for the potential for increased air emissions and energy impacts of the requirements of this final rule. See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Comment ID 316bNFR.023.005

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Subject Matter Code 7.4

Water Withdrawal threshold

Dow supports the threshold approach for application and implementation of the various requirements associated with the 316(b) standards for new facilities. The threshold approach would also help to avoid applying burdensome procedures to several thousand CWIS that have little or no potential for causing adverse environmental impact.

EPA Response

No response needed.

Comment ID 316bNFR.023.006

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Subject Matter Code 7.4

Water Withdrawal threshold

Dow believes that the proposed cutoff level of two million gallons per day (mgd) is too low and therefore not a realistic threshold. Dow urges EPA to revise this threshold to a reasonable level, which can be applicable to the 316(b) rules.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.023.007

Subject Matter Code 20.2

Monitoring Requirements

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Dow believes that the 316(b) requirement of extensive and open-ended biological monitoring of CWIS is onerous and expensive and should be reduced to a reasonable and prudent monitoring frequency during both pre-construction operations and normal operations time. Facilities, which have complied with the stringent technological requirements of Section 316(b), which will reduce adverse environmental impact by 97% -99% should have their biological-monitoring requirement eliminated or greatly curtailed.

EPA Response

The final rule adopts a different approach. It does not include mandatory baseline biological characterization monitoring under Track I. In this case, the applicant would have the opportunity to rely on and present recent historical or literature information to support its selection of design and construction technologies. Under this approach, applicants would propose what design and construction requirements are most appropriate to reduce impingement and entrainment or to maximize impingement survival resulting from water withdrawn as make-up water at these facilities. The biological characterization information would support the design and construction technologies that the permittee chose to implement. The Director could revisit these design and construction technologies at the time of permit renewal. For the final rule in Track I, EPA does not require baseline biological characterization monitoring. Rather, it requires the applicant to gather and present historical information and/or literature to support or justify the design and construction technologies the applicant chose to implement at the new facility. See 40 CFR 125.84(4).

Under Track II, a facility would need to conduct a comprehensive demonstration study that documents that an alternative suite of technologies can be used by the facility to achieve reductions in impingement and entrainment to the same level that would be achieved under Track I. Thus, Track II would provide an applicant who does not want to commit to any of the technology options with an opportunity to demonstrate that site-specific characteristics, including the local biology, would justify another cooling water intake structure technology, such as once-through cooling. For these situations, the applicant could demonstrate to the permitting agency, on the basis of site-specific studies, either that the proposed intake would not create an appreciable risk of adverse environmental impact or, if it would create an appreciable risk of adverse environmental impact, that the applicant would install technology to “minimize” adverse environmental impact.

Comment ID 316bNFR.023.008

Subject Matter Code	10.021
Request for Comment: Intake Velocity Limitation	

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Dow urges EPA to review its velocity flow restriction of less than or equal to 0.5 feet per second, in regard to the Zebra Mussel infestation in many of the nation's water bodies. Water velocities of 1.6 to 2.3 feet per second are reported to provide high colonization potential for zebra mussels.

One of the major strategies for controlling the mussels in water intake structures other than the injection of chemical treatment additives is to provide water velocities that inhibit colonization. These velocities may approach 6 feet per second or greater. Fine exclusion devices used to prevent adverse environmental impact can become a prime source or collection point for Zebra Mussel colonies. Only the coarsest of screen material can be used in order to control mussel colonization in CWIS.

EPA Response

EPA recognizes that maintaining sufficiently high intake velocities is one possible solution for minimizing settlement by biofouling organisms. However, further research by the Agency suggests that this is not the most effective technique. Often, intake velocities are designed to be as low as possible to reduce the impingement and entrainment of aquatic organisms. Additionally, the intake systems of many facilities are unprepared to support such high intake velocities and would possibly require modifications in order to maintain such velocities. An analysis of facility survey data at existing facilities suggested that only 33 (3.4 percent) of 978 surveyed facilities have intake velocities of sufficient magnitude (greater than 5 ft/s) to inhibit biofouling. While EPA recognizes that there is a possibility for the increased use of biocides (the most common treatment method used in the United States and Europe), it should be noted that biocides are not the only treatment method. A variety of viable alternative technologies and management strategies for dealing with biofouling are available. Examples of these options include the use of construction materials that inhibit attachment of organisms, mechanical cleaning, and heat treatments. While no one strategy has been shown to be universally applicable, there are certainly affordable and implementable options. Maintaining a high intake velocity has not been shown to be the most effective way to control biofouling, since other methods have been shown to be more effective at a lower cost, especially in the context of new facilities. A facility that has yet to be constructed can integrate biofouling control technologies into its design and minimize the impacts of biofouling on normal operations.

Also see 316bNFR.022.002, 316bNFR.022.007, 316bNFR.503.005, 316bNFR.028.031, and 316bNFR.063.010.

Comment ID 316bNFR.023.009

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Subject Matter Code 7.4

Water Withdrawal threshold

Dow believes that EPA must establish a practical and realistic threshold approach for both the new facility rule and the existing intake rule.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA notes that this rule applies to new facilities only. Existing facilities will be addressed under Phase II and III regulations.

Comment ID 316bNFR.023.010

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

Dow believes that EPA should change its terminology used in the proposed regulation pertaining to the arbitrary 25% value used to specify the amount of water withdrawn for cooling purposes in the definition wording to define a CWIS. Dow feels that the agency should use the term "major use" which has been interpreted by many permitting authorities, as an intake structure for a facility that uses more than 50 percent of the water drawn for cooling purposes. The 25% figure seems to be as arbitrary as the two mgd total flow threshold which mandates that most cooling water withdrawn from U.S. surface water bodies are subject to this proposed rule's requirements on adverse environmental impact. EPA must adapt thresholds that are simple and reasonable.

EPA Response

EPA has retained the twenty-five (25) percent threshold but removed it from the definition of a cooling water intake structure and placed the threshold in the applicability requirements of the final rule. EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

EPA disagrees with the commenter that 2 MGD is an arbitrarily set threshold. For an explanation of the 2 MGD threshold, see Response to Comment 316bNFR.030.002.

Comment ID 316bNFR.023.011

Subject Matter Code MISC

Miscellaneous Comment

Author Name Charles C. Vaughn, Jr.

Organization The Dow Chemical Company

In conclusion Dow feels that EPA should focus its efforts on making the proposed rule a flexible and less burdensome regulation.

EPA Response

EPA believes that the final rule is more flexible and less burdensome than the proposed Rule. The final rule establishes technology-based performance requirements, based on a two-track approach. The less burdensome Track I is a "fast-track" approach based on a commitment by the facility to employ a suite of technologies that would represent best technology available for minimizing adverse environmental impact. The more flexible Track II allows the applicant the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Maureen F. Vaskis

On Behalf Of:

PSEG Services Corp.

Author ID Number:

316bNFR.024

Note

Fully supports the comments made by UWAG (316bNFR.068), EEI (316bNFR.069), and EPRI (316bNFR.056)

Comment ID 316bNFR.024.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Maureen F. Vaskis

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PSEG has a strong interest in this rulemaking both because it will affect its development of new generating stations and because it may affect, indirectly, the acceptance of conservation measures<FN 1> that have been adopted into permits for existing facilities.<FN 2> While existing facilities are to be addressed in a subsequent ("Phase II") rule, PSEG believes it is important for EPA to adopt appropriate, defensible, and consistent positions with respect to key issues such as "adverse environmental impact" ("AEI") and the consideration of conservation measures throughout the Sec. 316(b) regulatory structure.

Footnotes

1 EPA and others use terms such as "mitigation" or "restoration" in reference to environmental improvement initiatives, such as habitat restoration, undertaken pursuant to Sec. 316(b). PSEG prefers to use the phrase "conservation measures." This is a more appropriate phrase than "mitigation" to describe such projects because they provide a wide variety of environmental benefits in addition to reducing (or mitigating) intake losses. The term "conservation measures" is more appropriate than "restoration" because measures involving the restoration of habitat represent only a subset of the various approaches that are available in the context of Sec. 316(b) decision making.

2 With respect to other issues arising in the context of this rulemaking, PSEG supports and relies on the comments submitted by the Utility Water Act Group ("UW AG"), of which PSEG is a member and the Edison Electric Institute of which it is also a member.

EPA Response

EPA has developed appropriate, defensible and consistent positions with respect to what constitutes adverse environmental impact and importance of conservation measures in the 316b new facility rule. These positions are embodied in the final rule and in the "Economic Analysis" and "The Technical Development Document".

Comment ID 316bNFR.024.002

Subject Matter Code 10.01

Regulatory Framework Options

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One of the most important, fundamental flaws in the proposed new-source rule is that it fails to recognize the key statutory difference between the place-based or site-specific approach inherent in Sec. 316(b), on the one hand, and purely technology-based approaches, such as the effluent guidelines program, on the other. The latter requires that all permittees within a source category meet effluent limits based on achievable technologies, regardless of differences in ambient conditions from one location to another. In stark contrast to the effluent guidelines approach, Sec. 316(b) combines technology and place-based environmental considerations by requiring the use of technology only where it has been found necessary to reduce AEI. Sec. 316 is unique in this regard. EPA has recognized this key difference in the past, but appears to ignore it altogether in the proposed rule. While EPA clearly would have authority to allow new-source permit applicants who seek expeditious permitting to elect an optional permitting path in which AEI is assumed to exist, EPA cannot require that permit writers ignore AEI considerations, including the effect of conservation measures on AEI, by specifying uniform best technology available ("BTA") for whole classes of waterbodies regardless of site-specific considerations. In this important respect, the proposed rule is flawed both legally and from the standpoint of sound public policy.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. This approach establishes specific capacity, velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment impacts while also allowing flexibility to accommodate site-specific attributes. EPA believes that it has implemented standards that should address AEI from new facilities through implementation of technology requirements while allowing flexibility for permittees as well as permit writers to address site-specific conditions with alternative technologies and/or additional requirements as deemed necessary. EPA does not believe that this approach allows permit writers to “ignore AEI considerations”.

Comment ID 316bNFR.024.003

Subject Matter Code EXIST

Existing Facility Rule

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Although the current rule is intended to affect directly only new, "greenfield" sources, PSEG is concerned that it might disrupt existing-source permitting. Permit writers may perceive the proposed rule' s abrupt departure from prior practice and precedent as a signal that EPA might look with disfavor upon the renewal of permits that have allowed voluntary conservation measures to reduce potential AEI and, in essence, to force a decision requiring additional technologies. Regulators may view the rule as undermining their long-standing discretion to consider conservation measures in determining how best to preserve and restore ecosystems within their jurisdiction when making decisions pursuant to Sec. 316(b). Potential sponsors of conservation measures could be discouraged from proposing such projects in the future, and the substantial confusion caused by EPA ' s proposed new approach could add unnecessary delays to the existing-source permit renewal process.

PSEG acknowledges and appreciates EPA's language in the preamble to the proposed rule indicating that EPA did not intend to cast disfavor on existing conservation measures in existing permits. In the context of the restoration options discussion, the preamble states: "[t]he Agency also does not intend the foregoing discussion to affect any ongoing permit proceedings or previously issued permits, which should continue to be governed by existing legal authorities." 65 Fed. Reg. 49091. This is the correct approach, and EPA should include a similar and very clear statement with respect to the effect of the final new source rule.

Another portion of the preamble notes, however, that the final new-source rule, when issued, may be used as guidance for permitting decisions affecting existing sources. 65 Fed. Reg. 49064. This statement is troubling. EPA may well determine, ultimately, that conservation measures have a more appropriate role in the existing-source rule than in the new-source rule, given factors such as the as yet unpublished permitting history at existing plants, and the significant technical and economic obstacles that retrofitting technologies would present in many locations. The Agency should, nonetheless, avoid any statements in the final new source rule that could be interpreted to suggest that provisions, which might limit or condition the role of conservation measures for new sources would have any applicability for existing-source permit renewals.

Even before issuing a final rule, EPA should take steps to eliminate any confusion resulting from the preamble language described above. EPA should make certain that the EPA Regions and states involved in permit renewals do not disrupt or delay existing permit decisions authorizing the use of conservation measures that have been approved and/or are undergoing implementation and evaluation or to preclude regulators from considering such measures proposed by permittees.

In addition, EPA should recognize in the final rule that voluntary conservation measures can play a valuable role in new-source permitting as well as existing-source permitting. Even if a new source is able to install costly technology, conservation measures may provide greater benefits to particular watersheds or comparable benefits at substantially lower cost. In the final rule for new sources, EPA should take a strong position encouraging voluntary conservation measures by making it clear that permitting authorities retain the discretion to evaluate such measures as part of the permitting process

and to determine, in appropriate cases, that these measures reduce the need for technologies that otherwise would be required. EPA has a strong legal basis for taking this position, and it represents the best public policy.

EPA Response

With regard to the first point raised in this comment submission, EPA has stated in the preamble to the final regulation that the rule being promulgated today in no way affects permit proceedings or previously issued permits which continue to be governed by existing legal authorities. If conservation measures are discussed in various existing source permit negotiations, then these discussions remain unaffected by today's final rule.

As regards the commenters concern about the preamble language found on page 65 FR 49064, EPA has addressed the extent to which this final regulation will serve as guidance for developing section 316b requirements for existing facilities prior to the promulgation of the section 316b regulations for existing facilities. This discussion may be found in the preamble to the final regulation.

In addition, prior to the promulgation of this final rule, EPA did provide explicit guidance to EPA regions and the states regarding the use of the proposed rule for new facilities as guidance in ongoing permit discussions. A memorandum dated Dec. 28, 2000 to EPA regional and state NPDES permitting offices discussing various aspects of the proposed rule and their applicability to ongoing permitting discussions may be found in the Record supporting this final rule.

Finally, today's rule allows for the consideration of restoration measures under the site specific approach of Track II (see 125.84(d)(1)(i) and 125.89(b)(1)(ii)).

Comment ID 316bNFR.024.004

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

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VOLUNTARY CONSERVATION MEASURES HAVE BEEN A LONGSTANDING PART OF THE SEC. 316(b) PROGRAM AND HAVE PROVIDED SUBSTANTIAL BENEFITS

Since the mid-1970's, EPA guidance and decisions, as well as state permitting activities, have encouraged voluntary conservation measures as part of the Sec. 316(b) permitting process. Conservation projects implemented pursuant to the existing EPA policy and state permit decisions have conferred substantial environmental benefits.

One of the best examples of successful reliance on conservation measures as a means of resolving issues arising under Sec. 316(b) is the EEP. In 1994, PSEG's EEP was incorporated into the Salem's NJPDES permit by the New Jersey Department of Environmental Protection ("NJDEP"), with EPA's concurrence. The NJPDES permit includes provisions requiring extensive restoration and preservation of wetlands in the Delaware Estuary, installation of fish ladders on numerous tributaries to the Delaware River, and a comprehensive biological monitoring program throughout Delaware Bay. The NJPDES permit also required that PSEG make: modifications to its CWIS to improve the survival of impinged organisms; conduct a feasibility study to determine the efficacy of using sound to deter fish from the vicinity of the intake limit the amount of cooling water that may be withdrawn; and develop and implement a comprehensive biological monitoring program.

PSEG's wetlands restoration initiative, in particular, responded to concerns raised by the NJDEP that the operation of Salem's CWIS had the potential to cause long term AEI due to impingement and entrainment losses. The EEP demonstrates that wetlands restoration can be successful on a very large scale, that degraded aquatic habitat can be restored and that it is a cost-effective method of achieving the objectives of Sec. 316(b) as well as broader objectives, such as reversing the decline in the nation's valuable wetlands resources and encouraging flexible, innovative solutions to environmental issues. Moreover, the EEP provides compelling evidence that the collaborative and transparent process of working out the details of a conservation project in the course of permit issuance enables permitting authorities to tailor a solution to particular concerns they have identified as high priorities in a watershed. {see Attached case study regarding EEP--316bNFR024_Case study}

EPA Response

Today's final rule for new facilities includes restoration measures as part of Track II. EPA is including restoration measures in Track II to the extent that the Director determines that the measures taken will increase the fish and shellfish in the waterbody in a manner that represents performance comparable to that achieved in Track I. See preamble sections V.B.2.f and VI.L for discussions on the role of restoration or enhancement measures in today's rule.

Comment ID 316bNFR.024.005

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

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Other Examples of Conservation Measures

Over the past fifteen years, conservation measures have been utilized extensively in numerous Sec. 316 permitting decisions. These measures have included habitat improvement projects, restoration of degraded wetlands, construction of artificial reefs, fish stocking programs, and other measures. See, e.g., Potomac Electric Power Company, Chalk Point Generating Station, Modification of NPDES Permit No. MD0002658B (MDES 1987) (fish stocking program); in re Florida Power Corporation, Crystal River Power Plant, NPDES Permit No. FL00O0159; EPA Region N (Sept. 1, 1988) (fish hatchery); Final Report to the Coastal Comm'n., San Onofie Nuclear Generating Station, Calif., Doc. No.89-02 (Aug 1989), (wetlands restoration and construction of artificial reefs).

EPA Response

EPA has included restoration measures in Track II to the extent that the Director determines that the measures taken will increase the fish and shellfish in the waterbody in a manner that represents performance comparable to that achieved in Track I. See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures.

Comment ID 316bNFR.024.006

Subject Matter Code	15.1
Request for Comment:	*Role of Restoration*

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APPLICABLE LAW AND SOUND PUBLIC POLICY COMPEL THE CONSIDERATION OF CONSERVATION MEASURES IN SEC. 316(b) PERMITTING.

Introduction and Summary

In appropriate instances, EPA must consider conservation measures in determining whether, and if so to what extent, there is a need for implementation of additional technological requirements in a Sec. 316(b) permitting action. The language of Sec. 316(b) allows a permitting authority to impose technical requirements only where necessary to minimize AEI. Whether a particular CWIS will cause AEI may depend, in part, on whether voluntary conservation measures would be implemented and, if so, whether those measures have been or would reduce or eliminate a potential AEI.

To determine whether a CWIS may cause AEI, it is necessary to define that term in a manner that best reflects the statutory objectives. The CWA, longstanding EPA interpretations, and judicial opinions based on well-established scientific principles lead to the conclusion that the concept of AEI must reflect impacts on populations or communities of aquatic species, not losses of individuals. The latter approach would ignore the remarkable ability of these species to propagate and sustain themselves after even large losses of early life stage organisms.

Other statutes confirm that it is appropriate to consider conservation measures as part of the Sec. 316(b) program. The National Environmental Policy Act ("NEPA") and regulations promulgated thereunder by the Council on Environmental Quality ("CEQ") authorize and compel consideration of "mitigation"-broadly interpreted-as a potential method of reducing impacts below levels requiring an environmental impact statement ("EIS"). Numerous other federal environmental statutes, including the Endangered Species Act, Sec. 404 of the Clean Water Act, and the Coastal Zone Management Act have been interpreted to incorporate consideration of conservation measures and lend further support for a similar role in Sec. 316(b).

Finally, an EPA decision to disallow consideration of conservation measures in identifying AEI and appropriate technologies in the context of Sec. 316(b) permitting would run directly counter to ongoing EPA efforts to replace the rigid, one-size-fits-all mentality that has plagued environmental regulation in the past with a more rational and flexible approach that encourages cost-effective, innovative solutions.

EPA Response

EPA believes, consistent with EPA's ecological risk assessment guidelines, that it is reasonable to interpret adverse environmental impact as a range of impacts, including impingement and entrainment, diminishment of compensatory reserve, stresses to the population or ecosystem, harm to threatened or endangered species, and impairment of State or authorized Tribal water quality standards. EPA has taken primarily a technology-based approach to this national rule and believes that the technologies

required by today's rule will minimize the impingement and entrainment of all life stages of fish and shell fish and maximize survival of impinged life stages of fish and shellfish, therefore, further the objectives of the Clean Water Act. See response to comment 316bNFR.008.012. In today's rule, EPA has included restoration measures in Track II to the extent that the Director determines that the measures taken will increase the fish and shellfish in the waterbody in a manner that represents performance comparable to that achieved in Track I. See preamble sections V.B.2.f and VI.L of today's final rule for a discussion on restoration measures. With respect to NEPA, see response to comment 316bNFR.024.010.

Comment ID 316bNFR.024.007

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

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Best Technology Available requirements apply only where there is AEI that must be minimized

The legal foundation for consideration of conservation measures within the Sec. 316(b) regulatory framework begins with the words of Sec. 316(b): the location, design, construction and capacity of cooling water intake structures must reflect the best technology available for minimizing adverse environmental impacts." Unlike Secs. 301 and 304(b) of the CWA, which impose national technology-based requirements without reference to ambient environmental conditions, Sec. 316(b) looks to both environmental conditions within a specific ecosystem, and to technology options for addressing those conditions. The only permissible reading of Sec. 316(b) is that regulatory controls are authorized only when there is an adverse environmental impact to be minimized. Thus, it is well established that a finding of AEI caused by the CWIS is prerequisite to the permitting agency's authority to impose additional technological requirements. In re Pub. Serv. Company of N.H., Seabrook Station, NPDES Permit Application No. NHO020338, Decision on Remand, Case No.76-7, EPA Region I (June 10,1977) (decision of the Administrator) (Seabrook I) at 10. EPA has made it clear in the past that AEI first must be identified before the need for additional technology is considered. See, 41 Fed. Reg. 17,387-88 (1976) (preamble to 1976 Sec. 316(b) regulations). It is equally clear that the permitting agency must carry the burden of making and supporting the finding that AEI is being caused by the CWIS. In re Central Hudson Gas and Electric Corporation, Decision of the General Counsel No. 63, EPA (July 29,1977) at 26.

Consequently, if the potential for AEI to be caused by operation of a CWIS has been, or can be, reduced below the level of concern warranting a regulatory response, then the permitting agency lacks authority, indeed it lacks any need or justification whatsoever, to impose BTA. Similarly, if AEI can be reduced to levels requiring a less-extensive regulatory response, then the type or scope of technological measures that could be imposed would be limited to the need for addressing whatever residual impacts are demonstrated. The permittee is not prohibited from voluntarily undertaking steps to accomplish these objectives through any appropriate means. The agency's responsibility is to evaluate whether the objective has been met, in the case of steps already undertaken, or will be met, in the case of proposed steps. Proposed initiatives would require analysis of whether AEI is likely to be caused by a CWIS plus a determination that prospective implementation measures to reduce AEI will be ensured through appropriate and fully enforceable obligations.

Conservation measures represent one such appropriate means for sources to reduce the potential for causing AEI to below the level of concern warranting a regulatory response<FN 7>, or, alternatively, to a level requiring a reduced regulatory response. Conservation measures may be relevant either in the evaluation of a new source's potential contribution to AEI, possibly eliminating or reducing the need for BTA, or in addressing AEI through the design and implementation of future projects in lieu of potential BTA measures. As discussed below, conservation measures offer the opportunity to achieve the objective of Sec. 316(b) in a cost-effective fashion while providing long-lasting ecosystem benefits, including benefits that extend beyond the specific entrainment and impingement losses associated with a CWIS ' s operation. The use of conservation measures not only is supported by the plain language of

Sec. 316(b), but should be embraced by any regulatory agency whose mission is to achieve meaningful environmental protection efficiently. Indeed, the guiding principles embodied in the National Environmental Policy Act, 42 U.S.C. §4321 et seq., require no less of every federal agency. (See discussion at Sec. III.C.1 below.)

Footnotes

7 Other voluntary approaches might include, for example, changes to the design or operation of the cooling system that are beyond the agency's authority to regulate in addressing the location, design, construction and capacity of cooling water intake structures pursuant to Sec. 316(b).

EPA Response

EPA disagrees that the CWA compels the statutory approach suggested by the commenter and that the phrase adverse environmental impact compels EPA to first examine the activity and demonstrate causation of population effects before requiring technology. See 316bNFR.068.007. Today's final rule establishes technology-based performance requirements, based on a two-track approach that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. A facility will be able to choose to comply with today's rule through implementation of Track I technologies or by implementing the requirements of Track II after a comprehensive demonstration study is performed. EPA has included restoration measures in Track II to the extent that the Director determines that the measures taken will increase the fish and shellfish in the waterbody in a manner that represents performance comparable to that achieved in Track I. See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II. With respect to restoration measures as a means to accomplish comparable performance, see 316bNFR.008.012. Finally, EPA does not believe that NEPA governs the decisions made by EPA in establishing requirements under section 316(b).

Comment ID 316bNFR.024.008

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

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[T]he value of voluntary conservation measures as a method to address a source's potential to cause AEI is closely related to the appropriate characterization of what constitutes AEI. Through EPA 's longstanding interpretation of Sec. 316(b), the considerable history of implementing Sec. 316(b) through permitting decisions, and in judicial precedent, it is well-established that AEI consists of demonstrable harm, caused by a source, to populations or communities of aquatic life. Losses of individual organisms do not amount to AEI unless substantial population-level or community-level harm results from those losses, taking into account any measures undertaken to reduce that harm. Thus, PSEG urges EPA to conclude in this rule that AEI should be determined to exist only where the net effect of a CWIS ' s operation causes AEI to the structure or the function of valuable biotic populations or communities to the extent that they cannot be maintained because the potential for recovery is virtually eliminated by the type, intensity or scale of the impact.

Prior to determining whether an AEI can be said to exist, one must consider whether the term "environment" in Sec. 316(b) was intended to be broad or narrow. One interpretive aid is the language of Sec. 104 of the CWA, which, among other things, concerns Congressional research goals as applied to thermal discharges. Sec. 104(t) refers to:

the total effect on the environment, considering not only water quality but also air quality, land use, and effective utilization and conservation of fresh water and other natural resources.

This is an indication that the "environment," for purposes of Sec. 316, was intended to encompass entire ecosystems. As a result, AEI should be determined with reference to ecosystems, not merely losses of individual organisms<FN 8> . This accords with EPA's 1975 Draft Guidelines, which stated: "Adverse environmental impact occurs when the ecological functioning of the organism(s) of concern is impaired or reduced to a level which precludes the maintenance of existing populations (emphasis supplied)<FN 9> ."

Consistent with Sec. 316(b)’s emphasis on ecosystem protection, EPA made clear over 20 years ago that AEI must be evaluated at the population level, and that even large losses of individuals do not necessarily equate with AEI. In the Seabrook decision, the Administrator emphasized that the loss of larvae through entrainment "cannot be expected to result in [the same degree of loss to] the adult populations because it does not take into account compensatory mechanisms and density-dependent limiting factors " Seabrook I at 41. He also acknowledged the importance of recruitment to populations from other areas, and rejected as excessively conservative the use of population models that fail to account for compensation. Id.

In a subsequent decision (following remand on procedural grounds), the Administrator reaffirmed these principles. In re Public Service Co. of New Hampshire, Seabrook Station, NPDES Permit Application No. NH 002-0338, Decision on Remand, Case No. 76- 7, Region I (August 14, 1978) (Seabrook II). He emphasized, for example, that entrainment mortality would not have an adverse impact on abundance and distribution of plankton "even though the total biomass...killed may amount to

hundreds or thousands of tons per year" because "[t]here is great ability of planktonic species to reproduce themselves rapidly," and "the Gulf of Maine is rich in plankton." Seabrook II at 18-19. The Administrator concluded that entrainment losses need not be quantified precisely because "the available sources of recruitment and replacement [were] so large" that populations were unlikely to be affected. Id. at 21-22 & n5.

Judicial approval of the Administrator's conclusions also could not be more clear. The First Circuit upheld the Administrator's decision in Seabrook II, endorsing his finding that, despite the loss of "many fish," fecundity of the species would maintain populations. Seacoast Anti-Pollution League v. Costle, 597 F.2d 306,309,311 (1st Cir. 1979). As the court put it, the central inquiry in assessing AEI was whether intake losses would "affect the ability [of fish species] to propagate and survive." Id. at 310.

EPA and state agencies have applied the Agency's population-based concept of AEI innumerous permit decisions through the years. In re Boston Edison Company, Pilgrim Power Plan Proposed, NPDES Permit Nos. MA 0003557 and MA0025135, EPA Region 1, (March 11, 1977) (large intake losses of individual blue mussel not causing adverse population impacts due to compensatory mechanisms) (hereafter Pilgrim); Potomac Electric Power Company. Chalk Point Generating Station, Modification of NPDES No. MD0002658B, Maryland Department of the Environment ("MDE") (Apr. 29, 1991) (existing intake structure represents BTA despite entrainment losses of 10-20 percent of population because no evidence of adverse impacts on fish populations); Indian River, EPA Region ill, Determination re: NPDES No.0000680 (July 11, 1983) (existing intake structure represented BTA despite reducible entrainment and impingement losses); Nebraska Public Power District, Gerald Gentleman II Power Plant, NPDES Permit No. NE0111546, Nebraska Department of Environmental Control, Case No.201, (Nov. 1981) (intake structure modifications not required absent a showing of significant adverse impact on fish populations); Florida Power Corporation, Crystal River Power Plant Units 1,2 and 3, NPDES Permit No. FL0000159 EPA Region N, (Dec. 2, 1986) (relevant impact is impact on macroinvertebrate communities, not individuals). This consistent application of the AEI concept firmly establishes that Sec. 316(b) is designed to address adverse impacts at the population or community level.

Finally, in several guidance documents issued pursuant to Sec. 316(b), EPA has articulated clearly the appropriate concepts for evaluating AEI. The Agency has left no doubt that the inquiry must be undertaken with respect to populations, not just individuals. In the 1975 316(b) Draft BTA Guidelines, for example, EPA said that "[a]dverse environmental impacts occur when the ecological function of the organism(s) of concern 'is impaired or reduced to a level which precludes maintenance of existing populations'... ." EPA, Draft Guidelines to Determine Best Available Technology for the Location, Design, Construction, and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact Sec. 316(b) P.L. 92-500 (December 5, 1975) at 52 (emphasis added). Similarly, in a 1976 Sec. 316(b) Development Document, EPA said that "[t]he major impacts related to cooling water use are those affecting the aquatic ecosystems. Serious concerns are with population effects that ...may interfere with the maintenance or establishment of optimum yields to sport or commercial fish and shellfish, decrease populations of endangered organisms, and seriously disrupt sensitive ecosystems." EPA, Development Document for Best Technology Available for the Location, Design, Construction, and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact (April 1976) at lines 580-587l.<FN 10>

Footnotes

8 See, T.J. Schoenbaum and R.B. Stewart, "The Role of Mitigation and Conservation Measures in Achieving Compliance with Environmental Regulatory Statutes: Lessons from Sec. 316 of the Clean Water Act, "8 N.Y.U. Envtl. L.J. 237 (hereafter, "Schoenbaum at ____").

9 Schoenbaum at 307, n190.

10 We note that a population- or community-level definition of AEI is fully consistent with other environmental regulatory programs and policies. For instance, the ocean discharge criteria under Sec. 403(c) of the Clean Water Act define unreasonable degradation of the marine environment by reference to changes in ecosystem diversity, productivity, and the stability of the biological community. See Handbook for Applying Sec. 403(c) Criteria of the Clean Water Act (Nov. 13,1981, rev. May 26, 1982). In addition, EPA's Ecological Risk Assessment Guidelines follow a population- or community-level approach in assessing environmental harm. See 63 Fed. Reg. 26,846 (May 14, 1998). Other environmental statutes, such as the Marine Mammal Protection Act and the Endangered Species Act, also look to impacts on communities or populations, rather than individuals, in assessing impacts for regulatory purposes. See, e.g., 54 Fed. Reg. 40,338 (Sept. 29, 1989) (Fish and Wildlife Service must take species or stock status and recruitment rate into account in determining whether a taking of marine mammals has a negligible impact).

EPA Response

Please see responses to comments 316bNFR.507.004, 316bNFR.024.007, 316bNFR.068.007, 316bNFR.068.008, and section VI.L. of the preamble (restoration).

Comment ID 316bNFR.024.009

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

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Since it is well established that (1) AEI caused by the CWIS must be established before additional technological measures may be required and (2) AEI must be evaluated at the population or community level, it follows that any appropriate approach undertaken by a permittee to eliminate, offset or otherwise reduce its contribution to AEI is a legitimate action, cognizable under Sec. 316(b), in lieu of imposing additional technological measures at the CWIS. Conservation measures offer some of the best and most efficient means of meeting those objectives.

For the same reasons, there is no logical or legal support for the position, advanced by some stakeholders, that AEI must first be addressed through the application of technology measures before alternatives, such as conservation measures, can be considered. While intake technology improvements should be designed to minimize AEI caused by operation of the CWIS, conservation measures represent one of the most attractive options for reducing or eliminating the causation of AEI in the first instance. To the extent conservation measures are successful, the need for BTA improvements may be avoided altogether or diminished to the point that less- extensive technology improvements will be sufficient, while ensuring that the statutory objective of minimizing AEI is achieved. Unlike the CWA's technology-based effluent guidelines, Sec. 3l6(b) addresses site-specific environmental harm caused by a CWIS, not the theoretical propensity of that CWIS to create unacceptable environmental conditions. It is far more sensible to implement a permittee's proposed conservation measures first, rather than to limit their applicability to addressing the residual impacts left by technological short-comings.

EPA Response

See response to comment 316bNFR.024.007, 008.012, 068.007, 068.008 and other portions of this record that explain why EPA is not adopting a population approach to the rule. See the preamble to the final rule regarding the role of restoration in this final rule.

The Prominent Role Conservation Measures Play in Other Contexts Supports The Conclusion that They Should Play a Similar Role in the Sec. 316(b) Context.

Sec. 316(b)'s emphasis on protecting ecosystems indicates that voluntary conservation measures fit well into the statutory scheme. Further support for allowing voluntary conservation measures to play an important role under Sec. 3l6(b) is found in the prominent role they play in a wide range of federal statutes, policies, and programs. A detailed examination of these is presented in the article, by Thomas J. Schoenbaum of the University of Georgia and Richard B. Stewart of New York University,<FN 11> cited above. This article demonstrates that conservation measures have a firm basis in the law. In this section, we summarize briefly some of the compelling legal arguments for allowing voluntary conservation measures to reduce or eliminate AEI and the consequent need for additional technological measures within the Sec. 316(b) program.

1.The National Environmental Policy Act ("NEPA") Compels Consideration of Conservation Measures

NEPA requires EPA and other federal agencies to review their regulations, policies and procedures and bring them into conformity with NEPA. NEPA has expanded the range of decisions that an Agency may make, even though it does not expand agencies' substantive powers.

The Council on Environmental Quality ("CEQ"), which NEPA created, has issued regulations for NEPA's implementation. These regulations specify that mitigation of adverse environmental consequences is a key substantive duty of all federal agencies. Mitigation measures are required to be considered in all environmental impact statements prepared by federal agencies<FN 12>. More importantly for purposes of Sec. 316(b), NEPA authorizes federal agencies to rely upon mitigation measures even when acting under a statute that does not mention mitigation<FN 13> .

The CEQ regulations define mitigation very broadly to include, among other things, rectifying the impact by repairing, rehabilitating, or restoring the affected environment, reducing or eliminating the impact by preservation and maintenance operations during the life of the action, or compensating for the impact by replacing or providing substitute resources or environments<FN 14>. These regulatory passages indicate that the concept of mitigation includes receptor-based meanings, i.e., referring to reducing the impact of an action on the affected environment. Moreover, the term "environment" in NEPA clearly refers to ecosystems.

Under NEPA, mitigation is a well-established component of federal agencies' analyses of potential impacts of federal actions. The United States Supreme Court has affirmed that mitigation is to be included, in detail, in environmental impact statements ("EIS"). See, e.g., Robertson v. Methow Valley Citizens Council, 490 U.S. 332,338 (1989). The CEQ's regulations implementing NEPA also require that EIS's address mitigation<FN 15> . Significantly, under NEPA, mitigation and conservation measures can obviate the need for an EIS by reducing a potential impact so that it is no longer significant.<FN 16>

Thus, the CEQ regulations authorize and compel full utilization of mitigation in federal programs and demonstrate that the term "mitigation" has a broad and flexible meaning. In meeting these obligations, EPA therefore should incorporate a broad range of voluntary conservation measures as part of the Sec. 3l6(b) program.

2. The Endangered Species Act Provides Guidance with Respect to the Role of Conservation Measures in Federal Environmental Programs

Mitigation of adverse environmental impact also is an important feature of the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531-1544. Sec. 7 of the ESA requires that, if a listed species may be present, a biological assessment must address "reasonable and prudent measures...necessary or appropriate to minimize such impact." Mitigation and conservation measures employed in this context have been adopted as integral to the legal foundation for decisions allowing projects to go forward<FN 17> . In Sec. 316(b), as under the ESA, efforts to "minimize" impacts should include conservation measures.

3. Sec. 404 of the CWA Is Another Compelling Example of the Importance of Conservation Measures in Clean Water Act Programs

Mitigation plays a prominent role in the CWA Sec. 404 program. Whether mitigation measures have been employed is a key issue in the granting of permits, even though Sec. 404 makes no mention of mitigation or conservation measures. EPA regulations, interpreting the term "minimize," incorporate mitigation into that concept. 40 C.F.R. §230.75(d). Consequently, in practice, the use of mitigation in Sec. 404 permitting is widespread. Mitigation is used to preserve wetland ecosystems; particular projects may include either on-site or off-site mitigation 33 C.F.R. §320.4(r)(1).<FN 18>

4.The Coastal Zone Management Act Also Supports The Use of Conservation Measures

The Coastal Zone Management Act ("CZMA ") also recognizes the importance of conservation measures. Under the CZMA, states implement coastal management programs, and federal actions affecting coastal areas must be consistent with the state program. See 16 U.S.C. §§ 1451-1465. In amending and reauthorizing the CZMA, Congress made clear that states may identify mitigation and other management measures that are not specifically detailed in the state coastal management program in order to make a determination that a particular project is consistent with the state program. H.R. Conf. Rep. No.964, 101st Cong. 1990 U.S.C.C.A.N. 2374,2677. Thus, the CZMA also supports the proposition that environmental impacts should be addressed through flexible strategies incorporating conservation measures to address site-specific needs.

We note that the Fish and Wildlife Coordination Act ("FWCA ") and the Federal Power Act ("FPA") are additional examples of the important role conservation measures play in federal regulatory programs. The FWCA takes a flexible, practical approach in determining appropriate measures to mitigate environmental impacts, see 46 Fed. Reg. 7644 (Jan. 23, 1981) (Fish and Wildlife Service Mitigation Policy), while the FPA addresses the adverse environmental impacts of water projects through a range of protective strategies, including mitigatory and other compensatory measures. See 56 Fed. Reg. 23108 (1991).

5.Conclusion

NEPA supports the use of conservation measures in federal programs, and conservation measures play an important role in many federal environmental programs, including those that implement statutory provisions devoid of any mention of conservation or mitigation. A failure by EPA to allow voluntary conservation measures to play a meaningful role in Sec. 316(b) permitting would be an unwarranted departure from the statutory language and precedents in NEPA, the Clean Water Act, and other environmental programs.

Footnotes

11 See, T.J. Schoenbaum and R.B. Stewart, "The Role of Mitigation and Conservation Measures in Achieving Compliance with Environmental Regulatory Statutes: Lessons from Sec. 316 of the Clean Water Act, "8 N.Y.U. Envtl. L.J. 237 (hereafter, "Schoenbaum at ____").

12 40 CFR §§ 1502.14(f) and 1502.16(g).

13 See, e.g., C.A.R.E. Now. Inc. v. Federal Aviation Administration, 844 F.2d 1569,1575 (1lth Cir. 1988).

14 40 CFR § 1508.20.

15 40 CFR § 1502.14(f) and 1502(h).

16 This is supported by case law, EPA regulations, and CEQ statements. See Schoenbaum at 277.

17 See Schoenbaum at 257-263. Similarly, Sec. 9 of the ESA prohibits the “taking” of a listed species. Incidental takings may be approved under Sec. 10 of the ESA. Mitigation or conservation plays a significant role in whether an applicant obtains an incidental take permit under Sec. 10. Friends of Endangered Species v. Jantzen. 760 F.2d 976 (9th Cir. 1985).

18 Cases also have held that receptor-based mitigation can be considered in determining whether there is a "practical alternative" under the Sec. 404 program. See Schoenbaum at 250-257.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II. EPA does not believe that the citations to other environmental statutes provide support for EPA's use of restoration under the CWA, but that EPA's authority for the two track approach derives from the authority of section 316(b) itself.

Comment ID 316bNFR.024.011

Subject Matter Code	15.13
Discretionary/Voluntary Approaches	

Author Name Maureen F. Vaskis

Organization PSEG Services Corp.

Voluntary Conservation Measures Are Consistent with EPA's Emphasis on Flexible, Cost-effective, Innovative Approaches to Environmental Issues

EPA has repeatedly and consistently emphasized the importance of a new approach to environmental issues, one that would be more flexible and more performance-oriented than the more rigid approach taken in earlier years. Executive Order 12866, stressed the desirability of selecting regulatory approaches that maximize net benefits, are cost-effective, and include incentives for innovation and flexibility to the greatest extent permissible under implementing statutes. Subsequently, EPA's "Project XL" set forth a primary example of the new approach. While some viewed Project XL with skepticism, and initially the Agency found it difficult to overcome programmatic inertia, a recent flurry of activity with respect to these projects bears testimony to the Agency's commitment to innovative, flexible solutions. EPA has not only continued to energize Project XL itself, but has sought to infuse all of the Agency's programs with the philosophy of encouraging flexibility and innovation so as to achieve cost-effective solutions.

The Sec. 316(b) program should support, not contravene, this important federal regulatory policy. Where it makes both economic and environmental sense, conservation measures should be encouraged as an innovative solution to CWIS issues. The EEP itself is a prime example of the tremendous benefits that such an approach can achieve.

Similarly, EPA's Office of Water has encouraged innovative and flexible solutions. One example is the point- non-point source trading program, an approach to achieving water quality goals that allows point source dischargers to arrange for non-point source controls instead of applying more expensive point source controls<FN 19> . This is akin to resolving issues arising under Sec. 316(b) through an appropriate choice of the technological and/or conservation measures that would achieve the greatest net benefit to the ecosystem. Point-non-point source trading encourages measures to achieve pollutant reductions from non-point sources more effectively and inexpensively than would be achieved by adding an extra layer of expensive controls on the already-well-controlled point sources. There have been some noteworthy successes under this trading program<FN 20> .

Of course, as is true of conservation measures in the context of Sec. 316(b), to be successful trading programs must incorporate mechanisms to assure comparability, adequacy, and accountability. PSEG, in cooperation with the permitting authorities and stakeholders, has made sure that the EEP includes all these features. For instance, under the 1994 Salem permit, PSEG has implemented a biological monitoring program to evaluate the effects of the restoration activities on the geomorphology, morphology, flora and fauna in the marshes. The design of the monitoring program was reviewed by the EEP's Monitoring Advisory Committee, which, as noted above, includes independent wetlands and fishery experts and regulatory agency scientists. In addition to the permit-required monitoring program, PSEG -working with prominent wetlands and fisheries scientists -also developed a supplemental monitoring program aimed at addressing marsh function. Another example of the broad accountability features of the EEP is the fact that PSEG maintains public access to the EEP sites and incorporates

its plans for restoration activities into Management Plans, which are developed with input from the Management Plan Advisory Committee. The MPAC to include independent wetlands experts, as well as a coastal engineering expert and representatives of the communities in which restoration sites are located. The restoration success is measured against quantitative success criteria, contained within the Management Plans for each site, as well as within the implementation permits. There is an adaptive management process that includes "triggers" which requires PSEG to assess and implement corrective actions to assure that the restoration process remains on a successful trajectory.

EPA's Supplemental Environmental Projects (SEP) Policy is another example of the encouragement of innovative, flexible solutions that recognize the value of conservation measures. The SEP allows parties to undertake environmentally beneficial projects in order to reduce penalties in civil settlements. SEPs have included a wide variety of conservation measures, such as restoration of areas negatively affected by a violation, or protection of ecosystems from damages resulting from the violation.

For instance, an EPA settlement with the General Electrric Company ("GE") requires GE to spend $150 to $200 million to clean up a contaminated two-mile stretch of the Housatonic River near Pittsfield, Massachusetts. A GE complex in Pittsfield that opened more than fifty years ago and closed in the early 1980s had polluted the Housatonic. Under the settlement, GE is required to remove tainted sediment, restore soil and vegetation on the riverbanks, and vegetate the surrounding area to create wildlife habitat. The New York Times, p. A16 (Sept. 25, 1998).

Footnotes

19 See, e.g., "EPA Draft Framework Document for Watershed-Based Effluent Trading," May 30,1996.

20 Trading and banking programs, of course, have a history of success in Clean Air Act programs, both state and federal.

EPA Response

See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II. EPA agrees that such an approach must incorporate mechanisms to assure comparability, adequacy and accountability and believes that the Track II requirements have been tailored to support these goals.

Comment ID 316bNFR.024.012

Subject Matter Code 9.4

Adverse Environmental Impact

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Definition of AEI

EPA decided not to propose a definition of AEI in the proposed rule. Instead, the preamble presents a broad range of options for consideration and comment. It is extremely important that the final rule incorporate a definition or approach to AEI that would not discourage the use of voluntary conservation measures in Sec. 316(b) permitting. Any approach that explicitly or implicitly assumes that any intake losses per se constitute AEI could have such a negative impact and must be avoided. This is important in both the new source Phase I rule and the existing source Phase I rule, and we believe EPA must achieve consistency between the two rules.

EPA Response

Please see response to comment 316bNFR.009.001 (AEI) and today's preamble section VI.L. (restoration).

Comment ID 316bNFR.024.013

Subject Matter Code	9.44
Request for Comment:	*Definition of AEI*

Author Name Maureen F. Vaskis

Organization PSEG Services Corp.

AEI Must Be Community- or Population-Based

Judicial and regulatory precedents should guide the Agency in addressing the definition of AEI in this rulemaking. EPA must refrain from departing significantly and abruptly from past precedent unless there is a very strong reason for doing so.

Under the legal requirements of decisional consistency and stare decisis, administrative agencies must provide a clear and persuasive rationale and substantial support in the administrative record for change from a prior decision. Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co., 463 U.S. 29,57 (1983); Greater Boston Television Corp. v. FCC, 444 F.2d 841,852 (D.C. Cir. 1970), cert. Denied, 403 U.S. 923 (1971). A change in position must be justified by a "reasoned analysis" that explicitly addresses prior precedent and demonstrates a sufficient basis in the facts of record for the change. Greater Boston Television at 852. Absent a clear, factually well-supported justification for changing course, an agency's decision to depart from its prior decisions will be judicially invalidated. See, e.g., Cleveland Construction. Inc. v. NLRB, 44 F.3d 1010, 1015-16 (D.C. Cir. 1995) (NLRB decision vacated for failure to follow prior NLRB precedent).

As described above, past precedent and sound science emphasize the need for defining AEI in terms of populations, not individuals. See Seabrook I and II; Seacoast Anti-Pollution League v. Costle; EPA 1975 Draft Guidelines. It is well-established that even large losses of individual organisms do not necessarily affect the viability of a species. See, e.g., Seabrook I; Pilgrim.

The proposed new source rule's concept of AEI also must recognize the importance of compensation. Compensation, which can allow a population to sustain itself or recover and thrive after individuals have been lost, is a phenomenon well-documented by fisheries scientists. Indeed, the Magnuson-Stevenson Fisheries Conservation and Management Act ("Act") incorporates compensation principles in establishing fish harvesting limitations. See 16 U.S.C. § 1801 et seq. The Act focuses on maximizing productiveness of fish populations while ensuring sustainability, and, in regulations implementing the Act, the National Marine Fisheries Service ("NMFS") recognizes that fish populations can withstand fairly high levels of exploitation and still remain sustainable. NMFS has stated its belief that a fish stock's maximum productivity can be achieved when the stock size is approximately 40 percent of the stock size that would be obtained if fishing mortality were zero (referred to as "the pristine level"). See 63 F ed. Reg. 24212,24219 (May 1,1998). In addition, NMFS also believes that a fish population will be able to sustain itself until the stock size falls below 20 percent of the pristine level. Id. EPA and the courts have long recognized the relevance of compensation mechanisms in Sec. 316(b) determinations. See Seabrook I at 41; Pilgrim, Att. 5 (Summary of Impact on Representative
Important Species), at 7.

Some stakeholders have opposed focusing on population impacts in defining AEI out of a mistaken belief that it is too difficult to determine whether measures designed to avoid or compensate for

adverse impacts (e.g. BTA) are achieving the intended benefits. The Agency needs to affirm, as it has repeatedly in the past, that expert scientific evaluation is fully capable of producing defensible decisions provided that appropriate monitoring and data gathering are put in place as an integral part of any program incorporating conservation measures. The comprehensive biological monitoring program that PSEG is implementing in connection with the EEP, for example, demonstrates that a well-designed monitoring program can provide sufficient evidence of the status of RIS populations to justify the use of restoration efforts in lieu of costly intake technologies. Moreover, the EEP-specific monitoring and analytical efforts described above indicate that it is entirely possible and appropriate to consider the benefits of wetlands restoration, fish ladders and other conservation measures to aquatic populations that are subject to the impacts of the operation of a CWIS.

EPA Response

Please see responses to comments 316bNFR.507.004, 316bNFR.068.007, 316bNFR.068.008, and section VI.L. of the preamble (restoration).

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Comment ID 316bNFR.024.014

Subject Matter Code 9.4

Adverse Environmental Impact

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Precise Comparisons of the Benefits of Conservation Measures with CWIS Impacts Are not Required

Some stakeholders oppose the consideration of population and community concepts in evaluating AEI because of the difficulty of quantitatively comparing environmental benefits of BTA or other responses with the negative effects attributable to a CWIS. It is not always possible to provide a direct comparison of the increased production brought about by conservation measures with the potential adverse impacts attributable to a CWIS, but this should not prevent EPA from recognizing the important benefits that conservation measures can provide. It is important to remember that there is no legal requirement that a one-for-one, complete offset be achieved - even for the application of BTA.

Especially where the abundance of aquatic populations are stable or increasing over the long term, such as is the case for most species in the Delaware, it is not possible to assign responsibility for these gains to any of the multiple factors that may be involved. For instance, it is extremely difficult, if not impossible, to separate the effects of improved water quality, more stringent fisheries management, and wetlands restoration measures on an improving fish population. With the results of well-designed modeling and monitoring programs, however, such as those used in the EEP and described above, it is possible to provide strong assurance of the benefits of conservation measures. With these tools, permitting authorities can be confident that important population-level improvements will be assisted by well-designed and properly-implemented conservation measures.

EPA Response

Please see today's preamble section VI.L. (restoration).

Comment ID 316bNFR.024.015

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Maureen F. Vaskis

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Preamble's Preferred Approach

Despite this, the preamble to the proposed rule indicates that EPA is considering a decision that AEI amounts to a loss of 1% or more of organisms in an area, as determined by a year-long study. 65 Fed. Reg. at 49074. EPA provides no basis for the 1% figure.

EPA must not promulgate this option. Although it may be preferable to some other options, such as considering the loss of any individual as AEI, using 1% of organisms as the AEI criterion is at odds with the statutory language and regulatory history of Sec. 316(b). This interpretation of AEI would completely ignore the well-established scientific fact that aquatic populations can recover from far greater percentage losses of individuals. Moreover, it could disrupt existing permit renewals by signaling a departure from EPA's past approaches for considering AEI, leaving permitting authorities to wonder whether EPA will interpret this term differently in the Phase II rule applicable to existing CWIS's.

EPA Response

Please see response to comment 316bNFR.031.008 and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.024.016

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Maureen F. Vaskis

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Options for Consideration of Conservation Measures

The Agency presents a number of options for incorporating, or not incorporating, conservation measures in Sec. 316(b) permitting. For the reasons stated throughout these comments, and immediately below, PSEG strongly supports an approach that embodies voluntary conservation measures as described briefly at pp. 49090-49091 of the preamble. PSEG offers comments on other options under consideration as well.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.024.017

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Maureen F. Vaskis

Organization PSEG Services Corp.

PSEG's Recommended Approach Is the Best Resolution

PSEG applauds the Agency's consideration of an option that would allow conservation measures as a direct alternative to technological measures to address the location, design and capacity requirements, partially or completely, in appropriate cases. We urge EPA to adopt this option in the final rule for the policy and legal reasons provided in Secs. I and III of these comments. This approach provides an incentive to permit writers and permittees to develop creative solutions to address potentially adverse conditions in particular watersheds. As the preamble suggests, conservation measures developed in this way are likely to result in greater overall environmental benefits to some watersheds and, therefore, should be encouraged.

If conservation measures can be used to create an appropriate balance with location, design, or capacity requirements, rather than as a requirement added onto BTA, permittees are more likely to develop projects that would be considerably more far-reaching, providing far greater benefits to a larger portion of a watershed, a broader range of aquatic and other species, and for longer periods of time. In some areas, permitting authorities are likely to find such projects preferable to technologies whose benefits would be restricted to a more circumscribed component of an ecosystem. Conservation measures, especially those related to habitat restoration, may be especially attractive due to both their potential to provide long-term benefits and their promise of ecological advantage and ancillary benefits. With a rule that incorporated flexibility for balancing conservation measures with location, design, and capacity limitations, permitting authorities will have an important tool with which to obtain these benefits.

Allowing conservation measures as an alternative means of addressing potential AEI also is consistent with the statutory objectives and analogous to longstanding agency practice under other, similar programs. As we discussed in Sec. III of these comments, conservation measures have become trusted, integral components of the Sec. 404, ESA, CZMA programs and NEPA implementation.

Conservation measures that are incorporated into an enforceable permit, with appropriate safeguards to assure that the measures are designed properly and will perform as expected, should be allowed to balance otherwise-applicable requirements if the overall environmental benefits to the watershed, or to the ecosystem as a whole, are expected to reduce or eliminate AEI or are comparable to those that would be achieved by the otherwise-applicable technological requirements. In this fashion, an appropriate conservation project should be allowed to overcome the permit issuing agency's concern that AEI will occur, and to provide the basis for permit conditions implementing Sec.316(b).

If EPA promulgates this option as a component of the final rule, EPA should issue clear guidance establishing certain basic principles for its implementation. Most important, in order to be considered under Sec. 316(b), the actions required for implementation and evaluation of conservation measures should be incorporated into enforceable permit conditions. Permit conditions should include action steps, deadlines, and success criteria. The permit also should include an ongoing program to ensure

that the conservation measures are being implemented appropriately. Scientists typically refer to this process as adaptive management . A key component of the adaptive management process is monitoring. Monitoring would need to include data gathering to facilitate timely and effective evaluation of implementation success. In addition, both the adaptive management and monitoring processes ideally should provide for appropriate participation by scientific or engineering experts as well as regulatory scientists and the public.

Footnotes

21 See e.g., Haney, A. and R.L. Power. 1996. Adaptive management for sound ecosystem management. Environmental Management, 20:879-886; Lee, K.N. 1993. Compass: adaptive management, chapter 3. pp.51-86. In: Compass and gyroscope: integrating science and politics for the environment, Island Press, Washington, D.C.; Thom, R. 1996. Goal Setting and Adaptive Management. pp. 4-1-4-20. In: planning and evaluating restoration of aquatic habitats from an ecological perspective, D. Yozzo, J. Titre and J. Sexton (eds.), U.S. Army Corps of Engineers, Vicksburg, MS.

EPA Response

See response to comment 316bNFR.024.007, 024.010 and the preamble to the final rule.

Comment ID 316bNFR.024.018

Subject Matter Code	15.1
Request for Comment:	*Role of Restoration*

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Conservation Measures

Notwithstanding any other Sec. of this rule, conservation measures proposed by a permit applicant may be considered by a permitting authority in assessing the extent to which a cooling water intake structure is likely to cause adverse environmental impact. The benefits of conservation measures to aquatic populations, watersheds, and aquatic ecosystems may be considered in determining appropriate location, design and capacity requirements that may be different from those set forth in Secs. X, Y, and Z. Permit writers should evaluate whether proposed conservation measures serve the functions and meet the criteria presented below in determining how they may be applied to a specific situation:

1. Conservation measures for purposes of this Sec. are measures that are likely to improve or enhance aquatic resources or ecosystems with the potential to experience AEI due to operation of a cooling water intake structure, or provide comparable or substitute environmental resources for those lost due to the effects of a cooling water intake structure. Such conservation measures include, but are not limited to, fish stocking or hatcheries, restoration, enhancement and/or preservation of wetlands and associated upland buffers, restoration or creation of reefs and other aquatic habitats, and the installation of fish ladders or other devices to remove obstructions to upstream spawning and nursery habitat;

2. Conservation measures may provide enhancements or resources in the near vicinity of a cooling water intake structure, or may be located off-site within the same aquatic ecosystem;

3. Conservation measures may enhance or provide the same, or ecologically similar, types of resources as those that maybe impacted due to operation of a cooling water intake structure;

4. Permits incorporating conservation measures must be reasonably related to the magnitude and duration of the impacts of the cooling water intake structure; and

5. Permit terms and conditions addressing conservation measures must include provisions for reasonably enforceable action steps, schedules, success criteria, adaptive management requirements, appropriate permitting and resource agency review of key implementation decisions, and monitoring.

EPA Response

See response to comment 316bNFR.024.007, 008.012 and the preamble to the final rule.

Comment ID 316bNFR.024.019

Subject Matter Code	15.11
Mandatory Approaches	

Author Name Maureen F. Vaskis

Organization PSEG Services Corp.

Other Options for Conservation Measures Identified in the Preamble Should be Rejected

One option identified in the preamble is a requirement for mandatory restoration measures as part of the requirements in more sensitive and most sensitive areas (all except where the CWIS is at least 50 meters outside the littoral zone). This option is ill-advised and should be rejected for several reasons. First, it is unlikely to withstand legal challenge. A regulation that required conservation projects would surely be challenged, and strong legal arguments could be made to oppose the requirement. Chief among these, of course, is the argument that requiring both technology and conservation measures exceeds the Agency's statutory authority. BTA is designed to minimize AEI. Once BTA is applied and AEI is thereby minimized, EPA lacks authority to go further.

In addition, as is explained above, conservation measures incorporated as mandatory elements would be much more limited in design and scope, and therefore unlikely to provide the substantial environmental benefits of projects such as the EEP. Indeed, the EEP never would have been implemented if this option had been incorporated into the Sec. 3l6(b) process for existing sources. Permittees facing the expense of installing mandatory BTA technologies could hardly be expected to implement comprehensive, resource-intensive conservation measures on such a scale.

Another option on which EPA seeks comment is precluding conservation measures from playing any role in Sec. 316(b) permitting. This option represents the worst possible public policy, and would be an indefensible retreat from the principles of innovation and regulatory flexibility that EPA has espoused. The principal legal argument having any merit for this option would appear to be that conservation measures are unacceptable because they do not ameliorate "specific harms" --the loss of particular organisms --which proponents of this option claim must be taken to mean AEI. As explained above, AEI need not, and should not, be defined in terms of the loss of individual organisms, and the Agency has never, before this proposal, even suggested such a view.

Proponents of precluding conservation measures also appear to base some of their objections on their belief that the success of conservation measures, such as wetlands restoration, cannot be demonstrated. PSEG has been monitoring certain effects of the restoration program. The energy outputs from marshes that are used by aquatic biota are numerous and complex, and have been the focus of research for over 30 years. These outputs range from dissolved organic matter used by bacteria, to small animals that are consumed in the bay, to the large predators such as fish and birds that consume the energy within the marsh and carry the energy out when they exit the marsh. These energy fluxes are recognized by scientists but are very difficult to quantify. PSEG has clearly demonstrated in its March 1999 permit renewal application for Salem's NJPDES permit, through the use of stable isotopes, that the marshes are a source of energy for forage and predator fish populations within Delaware Bay, a copy of which was provided to EPA by letter dated September 1999.

PSEG also was able to quantify some of the production of fish through the use of bioenergetics

modeling. Although this modeling was able to provide some quantification of increases in production of fish, the estimates are limited and represent a minimum estimate for several reasons, including the reliance on empirical data, the inability to account for detrital export-based production in the bioenergetics model, and the inability of the sampling gear to capture all of the fish and other organisms produced in or utilizing the marsh. Thus, the findings represent only a relatively small component of the energy produced by the marsh for fish production.

Evaluating the impacts of the restoration project is complicated by the size, complexity and dynamic ecology of the Delaware Estuary and its wetlands. For example, many successful efforts have been implemented that have improved water quality and other environmental factors in the Estuary, in addition to the EEP. As these efforts and the EEP bear fruit, the overall productivity of the Estuary has been increasing. However, it is difficult if not impossible to isolate and show what portion of that productivity is due to anyone particular factor, given the current state of the science.

PSEG has quantified a portion of the production from the restored salt hay farms and this incremental production is being transferred to the Estuary through seasonal migrations and trophic transfer. While it is not possible to directly correlate this incremental production with population conditions in the Estuary and near-shore coastal waters, the increased production is available to compensate for any adverse environmental conditions or biological factors, which may have an impact on juvenile recruitment in a particular year.

EPA Response

See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.024.020

Subject Matter Code 125.85

Alternative Requirements

Author Name Maureen F. Vaskis

Organization PSEG Services Corp.

Variance Options are not Satisfactory Means of Incorporating Conservation Measures into the Sec. 316(b) Program.

Proposed Sec. 125.85(a) would allow permitting authorities to impose less stringent requirements if a facility's compliance costs would be "wholly out of proportion to the costs EPA considered and determined to be practicable" (a Fundamentally Different Factor like variance). 65 Fed. Reg. 49092. PSEG assumes that conservation measures could be used in place of BTA in these situations, although this is not specifically stated in the proposal. The Agency solicits comment on this provision, including specifically, on whether factors other than cost should be a consideration.

PSEG believes that limiting this provision to those cases where a permittee can demonstrate that BTA costs are wholly disproportionate could effectively preclude the use of conservation measures in many situations where they could be beneficial. If this were the sole mechanism for allowing conservation measures to be used, the rule would run completely counter to the statutory language, applicable precedents, and EPA's desire to encourage innovative and cost-effective solutions. This variance would fail entirely to recognize that conservation measures may better serve the needs of a watershed while -at the same time - being more cost-effective than BTA. If better environmental results can be achieved more cost- effectively, it is not relevant whether the facility's compliance costs are wholly disproportionate to the benefit considered by EPA in this rulemaking. The Agency should be interested in the results that can be achieved through a flexible permitting structure.

EPA Response

See section VI.L of today's preamble for a discussion on the role of restoration in this final new facility rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

John W. Dax & Susan L. Taylor

On Behalf Of:

Cohen, Dax & Koenig, P.C. O-B-O
Sunset Energy Fleet LLC Commission

Author ID Number:

316bNFR.025

Note

Comments included a case study for a proposed project in an urban environment. The case study was not coded, but is provided as an Attachment.

Comment ID 316bNFR.025.001

Author Name	John W. Dax & Susan L. Taylor
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Subject Matter Code 10.01

Regulatory Framework Options

SUNSET ENERGY FLEET LLC ("SEF") is the developer of a proposed new electric generating facility in New York City .If adopted without change, the proposed regulations will adversely affect the ability to site new sources of electricity in densely developed areas. For the reasons expressed in these comments, SEF urges EPA to leave sufficient flexibility in the regulations so that cooling technologies best suited to the peculiar needs of different locales can be identified and implemented.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. With the two-track technology-based approach promulgated today facilities will have flexibility to install cooling water intake structures best suited to their particular needs as long as the requirements of Section 125.84 are met.

Comment ID 316bNFR.025.002

Subject Matter Code	10.01
Regulatory Framework Options	

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Section 316(b)

Clean Water Act section 316(b), 33 U.S.C. § 1326(b), mandates that regulations applicable to point sources require "that the location, design, construction and capacity of cooling water intake structures reflect the best technology available ["BTA"] for minimizing adverse environmental impact." 33 U.S.C. § 1326(b); see also Cronin v. Browner, 898 F. Supp. 1052,1056 (S.D.N. Y. 1995). Section 316(b) does not limit the "environmental impact" that EPA must minimize to entrainment and impingement impacts.

In accordance with a court directive, EPA has proposed regulations to implement section 316(b)'s mandate with respect to certain new facilities. EPA's proposed national performance requirements, based on a new framework of four categories of surface waters, represent a complete reversal from its previous policies of evaluating technologies on a site-specific basis. EPA also proposes using categorical rules based on the volume of water withdrawn and intake velocity.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

EPA is setting the same performance-based technology requirements for all waterbodies as for tidal rivers and estuaries (the most stringent requirements from the proposed rule) under Track I of the final rule. Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. Under Track II there are design intake flow requirements that are based on waterbody categories (see Section 125.84).

Comment ID 316bNFR.025.003

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

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Minimum Requirements Applicable to Estuaries and Tidal Rivers

Among its key proposals, EPA proposes to apply "the most stringent minimum requirements" to estuaries and tidal rivers. 65 Fed. Reg. at 49084. Unlike the other three categories of water bodies, where proximity to the "littoral zone" will determine the applicability of certain requirements, EPA's minimum requirements would apply to the entire water body of a tidal river or estuary. As applied to estuaries and tidal rivers, those minimum requirements would (1) preclude all technologies other than closed-cycle recirculating cooling, 65 Fed. Reg. at 49087; and (2) limit intake flow to "no greater than one (1) percent of the volume of the water column in the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level," 65 Fed. Reg. at 49086.

EPA justifies these draconian requirements by asserting that "[t]he abundance and diversity of aquatic life within the estuarine and tidal river environment (composed of protected bays, sounds, and lagoons) are generally richer than those in any other water body type." 65 Fed. Reg. at 49084. EPA does not explain the scientific rationale for this simultaneously overbroad and vague statement. EPA also ignores major technological advances that have diminished the mortality impacts of once-through cooling to de minimis levels, relying instead on analytically unsupported assumptions, and, apparently, data from outdated facilities.

EPA's proposed framework will make it much more difficult (virtually impossible in certain locations) to site much needed electric generating capacity in New York City (and, almost certainly, in other cities with similar physical characteristics). Specifically, in the case of New York City, EPA's proposed estuary regulations -grounded in little science and even less economic analysis -will essentially remove once-through cooling as an option in a locale that is literally surrounded by tidal rivers and estuaries. Yet once- through cooling may be the only feasible cooling technology for certain sites. It may also, in the words of the New York State Department of Environmental Conservation, constitute Best Technology Available ("BTA") for certain locations that are otherwise best suited for siting new power plants. Comments of New York State Department of Environmental Conservation, Division of Fish, Wildlife, and Marine Resources on § 316(b) Rulemaking, September 10-11, 1998 ("September 1998 NYSDEC Comments"), at 4 (attached as Exh. A).

EPA Response

The final rule consists of a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Therefore, the discussion regarding whether or not estuarine and tidal river environments are more sensitive to CWIS impacts or whether these environments are richer in terms of abundance and diversity of aquatic life is no longer relevant. EPA has removed the waterbody classification approach based on legitimate

concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. In Track I, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones. Thus, EPA is setting the same performance-based technology requirements for tidal rivers and estuaries as for all other waterbodies under Track I of the final rule. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in comparable reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

EPA disagrees with the comment that the requirements preclude all technologies other than closed-cycle recirculating cooling. New facilities will be able to implement technology most appropriate and economically viable for their sites and set of circumstances to meet the requirements of Section 125.84. Also, the final rule does allow once through cooling if the facility can meet the requirements commensurate with closed-cycle recirculating system and all requirements of Section 125.84.

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See ,# 2-029, 2-013L-R15 and 2-013J). EPA also has determined that a capacity- and location-based limit on withdrawals in certain waterbody types is an achievable requirement that will have little or no impact on the location of cooling water intake structures projected to be built over the next 20 years as new facilities have the opportunity to choose sites that meet their specific design and cooling water needs before construction begins. While EPA believes this final rule will increase protection for aquatic communities, the Agency has determined that the proportional flow requirements represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole.

EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

EPA disagrees that the rule precludes facilities from being sited in most waterbodies. EPA examined all the information and determined that only nine new facilities would not be planning to meet the dynamic capacity requirements in the rule. The dynamic capacity and velocity requirements do not affect the location of the facility but rather the costs of building the facility. EPA examined the economics of the requirements of the rule and found the requirements to be economically practicable. Finally, EPA examined the siting implications of the proportional flow requirements and found these requirements to be technically available. See the preamble to the final rule.

Furthermore, this rule applies to new facilities and EPA feels that they have more flexibility in locating intake structures. New facilities have the opportunity to choose sites that meet their specific design and cooling water needs before construction begins. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet the requirements of Section 125.84. EPA

believes the two-track approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing and locating new facilities.

Comment ID 316bNFR.025.004

Subject Matter Code	22.1
CWIS Impacts and Benefits	

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The Need for New Generating Capacity

EPA's sweeping pronouncements could not come at a worse time in terms of the need for new electric generating capacity. It is common knowledge that New York State, and New York City specifically, are facing a dire shortage of electric generating capacity.

According to the Honorable Maureen O. Helmer, the Chairman of the New York State Public Service Commission ("NYSPSC"), "the actual New York State peak load in July 1999 exceeded the State Energy Plan forecast for the year 2003" (emphasis added). Testimony of Maureen O. Helmer, New York State Public Service Commission Before the Assembly Standing Committee on Energy, Aug. 2, 2000 (attached as Exh. B). With respect to New York City, Chairman Helmer said, "there is an immediate need for 300 MW now in New York City, and an additional 200 MW each year thereafter ." Id. "The most important step that we can all take is to expedite the process for power plant siting. New York City, like other areas of the Northeast, the Midwest, and California, is in a very serious situation. The fact is, the cushion between our existing supply of electric generation capacity and demand for electricity is shrinking." Id.

New York City officials confirm the Chairman's comments. A brief recently filed by the City of New York recited the following projections: A 1996 study by the NYSPSC, its most recent, of the generation needs of New York City, suggested that City needs as much as 3,472 MW of new generating capacity. Citing Case 94-E-O952, Analysis of Load Pockets and Market Power in New York State, Final Report, at 189 (act. 1, 1996). An even more recent study suggests that an additional 1,652 MW of electric generating capacity is needed by 2003. Citing Iroquois Gas Transmission, L.P., FERC Docket No. CP00-232-000, Initial Piling dated March 15, 2000, Exh. I(11), at 27. See Case No. 00-M-0095, Comments of the City of New York on the Proposed Settlement Agreement, at 5 (act. 16,2000) (attached as Exh. C). EPA's proposed regulations will make the already daunting task of siting new power plants in New York City positively Sisyphean.

EPA Response

EPA has considered the commenter’s concern and recognizes the important role electricity plays in the state of New York. However, based on the analyses in support of this rule, EPA has determined that the requirements of the final rule will not adversely affect electric facility siting or energy supply. For more information, see EPA’s response to comments 316bNFR.014.023 above and 316bNFR.512.003 (comment category 23.6), and Chapter 9: Other Economic Analyses.

Comment ID 316bNFR.025.005

Subject Matter Code	MISC
	Miscellaneous Comment

Author Name John W. Dax & Susan L. Taylor

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Mandating The Use Of Closed-Cycle Cooling For New Power Plants Imposes Significant, In Some Cases Fatal, Siting Restrictions As Well As Other Adverse Impacts

Locating a new generating plant -whether in New York City or elsewhere - requires the availability of real estate that is properly zoned and has access to existing natural gas and electric transmission lines. Unlike traditional utilities, independent developers of power generation facilities do not enjoy the power of eminent domain; they must obtain suitable real estate in the competitive market like all other buyers.

In highly-developed urban areas like New York City, these siting factors are compounded by the shortage of available space. Closed-cycle cooling technologies require significantly greater physical space than once-through cooling and reduce power generating efficiency, creating greater air emissions per megawatt hour of useful electricity. In addition, many of the various closed-cycle options impose other negative consequences, including greater municipal water consumption, visible water vapor plumes and drift.

EPA Response

EPA notes that it is not requiring wet cooling in the rule but is requiring reductions of impingement and entrainment in a manner comparable to the Track I requirements of the final rule. EPA considered the space requirements of the final rule and the air emissions resulting from the final rule and found them to
be acceptable. Please see response to comment 316bNFR.068.100. For these reasons, EPA has established a two-track final rule. Track I establishes specific requirements for a suite of technologies that would represent best technology available for minimizing adverse environmental impact. However, under Track II, an applicant has the opportunity to conduct site-specific studies to demonstrate that alternative technologies or configurations, including the relocation of an intake, will reduce impingement and entrainment to a level of reduction comparable to the level achieved if the facility implemented the Track I technology-based performance requirements. For examples of the types of alternative technologies that may be appropriate, see chapter 5 of the Technical Development Document. Furthermore a facility may choose to alternative sources of cooling water such as gray water, ground water, or municipal water.

EPA agrees that wet cooling towers reduce power generating efficiency and create greater air emissions per megawatt hour, however, EPA estimates that the national impact is very small if not negligible. For the final rule, EPA presented estimates of marginal annual increases in air emissions associated with installation recirculating wet cooling towers in lieu of once-through cooling systems. The Agency compared projected emissions under the rule to projected emissions absent the rule. EPA's final analysis clearly demonstrates that the number of in-scope facilities contributing to increased air emissions is small.

With respect to the other negative consequences that closed-cycle cooling may impose, such as greater municipal water consumption and visible water vapor plumes and drift. In the cases where visible plumes from evaporative cooling towers is a significant issue for the public and other stakeholders on the local level, alternative or additional technologies can be adopted in response to stakeholder sentiment. The two-track regulatory framework adopted by EPA in the final rule allows for this local, site-specific decision process. In the case where facilities, or public stakeholders, determine that an alternative technology to a traditional flow reducing type (such as recirculating wet cooling towers or cooling ponds) is necessary, the two-track methodology provides the flexibility for an equivalent aquatic environmental impact minimization to occur without producing a non-aquatic impact.

Comment ID 316bNFR.025.006

Subject Matter Code	10.01
Regulatory Framework Options	

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National Minimum Standards Are Unworkable and Will Prevent the Siting of Needed Electric Generating Capacity in South Brooklyn

For reasons that are not persuasive, EPA proposes to replace the site-specific approach it has condoned for more than two decades with rigid, national minimum thresholds. SEF believes that the preceding case study, and a careful review of its proposed facility, demonstrate the imprudence of such an approach. SEF believes the minimum thresholds as proposed will make it impossible to site desperately needed new generating capacity in south Brooklyn and, almost certainly, in other urban areas that share south Brooklyn's characteristics. Because the alternatives to once-through cooling are infeasible at the proposed Site, and because there is no other available land in south Brooklyn that meets all relevant siting criteria, once-through cooling technology is the only technology available. Moreover, as SEF's exhaustive environmental review makes plain, its once-through cooling system is BTA for this site because its impingement and entrainment impacts are de minimis and it meets all regulatory criteria.

EPA claims that the national minimum thresholds are necessary because "[t]he existing case-by-case approach requires significant resources on the part of the regulatory authorities that must implement section 316(b) requirements." 65 Fed. Reg. at 49079. However, the NYSDEC has already told EPA that there is no single, "magic bullet" BTA technology that can be applied on a water body environment basis. September 1998 NYSDEC Comments at 4 (response to EPA question "Is there a BTA technology that can be applied on a water body environment basis (e.g., estuary, lake, large river, ocean)?)." NYSDEC prefers "a national standard of performance for new sources with the narrative criterion of 'de minimis fish mortality,'" September 1998 NYSDEC Comments at 3. Even a permitting authority on whose behalf EPA is ostensibly acting in imposing rigid national standards did not, only two years ago, approve of those proposed standards.

Moreover, despite its avowed preference for closed-cycle cooling, NYSDEC has also said that "[a]n applicant for a new facility could have a once through cooling system considered as a component of BTA based on a showing that added costs and other impacts of closed-cycle cooling outweigh benefits realized" (emphasis added). Id In this case, the disadvantages of closed-cycle cooling are not only economic, but also engineering-based and environmental. As the case study demonstrated, other cooling technologies are incompatible with good engineering practices – they simply do not fit within the small space available. They are also incompatible with good environmental practices. Yet EPA's proposal denies permit writers the opportunity to balance de minimus fish impacts against tons of additional criteria pollutants in areas that are already severe or moderate non-attainment zones for those pollutants and against the impossibility of siting new generating plants in areas with a pressing need. Instead, a permit write reviewing a proposal to locate new electric generating capacity in a City literally surrounded by tidal rivers and estuaries must, in every instance, value the inconsequential number of impacted fish over the environmental, health and economic needs of the City's citizens.

Footnotes

6 NYSDEC's position is consistent with EPA's longstanding view that BTA is site-specific. A 1976 guidance document, Development Document for Best Technology Available for the Location, Design, Construction, and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact, EPA, Office of Water and Hazardous Materials, Effluent Guidelines Division, April 1976 ("BTA Development Document"), points out that "[t]he requirements of section 316 stand in contrast to those of sections 301 and 306, which call for the uniform achievement of effluent limitations based on the application of defined levels of technology ." BTA Development Document at 1-2.
One year later, EPA stated flatly that "environment-intake interactions. ..are highly site-specific and the decision as to best technology available for intake design, location, construction, and capacity must be made on a case-by-case basis." EPA, Office of Water Enforcement, Permits Division, Industrial Permits Branch, Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structure on the Aquatic Environment: Section 316(b), May 1, 1977 (" 1977 Guidance"). EPA is further on record as stating that "It is accepted that closed cycle cooling is not necessarily the best technology available, despite the dramatic reduction in rates of water used. The appropriate technology is best determined after a careful evaluation of the specific aspects at each site." 1977 Guidance at 12. Thus, EPA has a nearly 25-year-old policy of determining BTA on an individual basis (as well as a long-standing policy of not necessarily preferring closed cycle technology). It has failed to provide sufficient reason to reverse a policy that is functioning in the view of both regulators and the regulated community.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. EPA believes that the two-track technology-based approach allows permittees and permitting agencies to work together to determine whether a proposed intake structure is appropriate for a particular site. Permit writers will not mandate BTA. With this approach the permit writer does not have to determine what the potential AEIs are for a particular permittee just whether the facility is proposing technologies that will meet the performance requirements in Section 125.84. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet these requirements.

Comment ID 316bNFR.025.007

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name John W. Dax & Susan L. Taylor

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EPA Has Failed to Evaluate Urban Estuarine Environments

As the preceding case study demonstrates, not all tidal rivers and estuaries “provide an abundance of habitat, food, and refuge for the development of the early life states of the inshore and nearshore aquatic communities, including communities of meroplankton and holoplankton." 65 Fed. Reg. at 49084. EPA has insufficient scientific support for this assertion. To the contrary, salinity transition zones (like those found in estuaries) often have high turbidity, contributing to low productivity. For example, SEF's site-specific studies show that the portion of the Bay in which its intake structure will be located is an area of high turbidity, low productivity and low biological value. EPA's proposed treatment of estuarine systems fails to recognize that they are not all fertile breeding grounds.

EPA also proposes to limit intake flows on estuaries to "no greater than one (1) percent of the volume of the water column in the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level." 65 Fed. Reg. at 49086. However, insofar as is relevant to this discussion, EPA's jurisdiction extends only to the "capacity" of "cooling water intake structures." See 33 U.S.C. § 1326. By selecting a standard unrelated to the capacity of a cooling water intake structure, EPA has exceeded its authority.

As a substantive matter, EPA has not justified the selection of 1% in any meaningful way. SEF has demonstrated that its cooling water intake structure will impinge no fish, and will virtually eliminate entrainment. Accordingly, restricting the intake flow as a percentage of the estuary's water flow at low water levels is irrelevant and, accordingly, arbitrary. Similarly, EPA's failure to analyze the "achievability" of its estuary flow restriction is arbitrary. With respect to freshwater rivers and streams, EPA claims to have determined that its proposed restrictions are achievable by analyzing how many river miles could support facilities with specified withdrawal requirements. See 65 Fed. Reg. 49085-49086. EPA did no such analysis for estuaries. It has measured the impact of its proposal and has no way of knowing whether any power facility with any cooling technology can locate on an estuary.

The failure to evaluate estuarine environments on a site-by-site basis will severely and adversely impact urban environments faced with a shortage of land upon which to build power plants equipped with EPA's preferred cooling technologies.

EPA Response

EPA recognizes that on a case-by-case basis there is variability in the productivity of tidal rivers and estuaries. However, for the purposes of developing a national regulation EPA believes that the selected two-track approach is most rational - technologies are available and effective, and the rule is economically practicable for the affected industries. EPA believes that the two-track technology

approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns as noted in the comment.

EPA has analyzed the achievability of the estuary standards for both the proposed and final rule. For the final rule, EPA examined nearly 100 existing facilities and found that over 70 percent of them could meet the proportional flow requirement. EPA examined existing facilities because they were the only ones for which EPA had sufficient data to conduct such an analysis. Thus, EPA does not believe that it has failed to justify the selection of the 1 percent intake flow requirement or that "EPA's failure to analyze the achievability of its estuary flow restriction is arbitrary." Furthermore, EPA does not agree that it has exceeded its authority in establishing the intake flows for estuaries since the requirements established today are related to capacity of cooling water intake structures. See response to comment 316bNFR.025.003 and the preamble to the final rule.

Comment ID 316bNFR.025.008

Subject Matter Code	17.0
Best Technology Available-Technologies	

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EPA Has Not Analyzed Improvements in Technology that Permit De Minimis Impacts

EPA's own proposal lays bare the problems with a one-size-fits-all approach. EPA's proposed definition of "cooling water intake structure" turns, in part, on the amount of water a facility proposes to withdraw from a "water of the United States." EPA proposes to regulate those facilities with a design intake capacity of 2 MGD or more. EPA states, "cooling water intake structure withdrawals that are at or below a two MGD threshold would generally affect only a very small proportion of a water body or, if the water body is very small, would have a localized impact." 65 Fed. Reg. at 49067. EPA then references two impingement/entrainment studies. Id. at 49068.

Yet the sole operating parameter of those facilities that EPA references is the volume withdrawn. EPA neither identifies nor analyzes the kind of designs, techniques and equipment employed to reduce entrainment and impingement, including approach velocity, through-slot velocity , screen design, the size of the openings in the screens, removal and return systems, behavioral barriers, fish ladders, fish buckets, protective coatings, intake depth adjustment, and exclusion technologies. EPA thus apparently reasons that a certain volume withdrawn leads inevitably to a certain number of organisms entrained or impinged. However, it is intuitively obvious that an intake of 2 MGD (unregulated under the proposed standard) in a richly productive estuarine ecosystem has the potential to have a much greater impact on aquatic life than an intake of an order or two magnitude higher MGD in an estuarine ecosystem with limited productivity.

Further, at least insofar as estuaries and tidal rivers are concerned, EPA simply ignores the significant technological advances that have occurred in the decades since "volume withdrawn = entrainment/impingement" was a fair equation. NYSDEC has described a "suite of technologies" that can meet New York's proposed standard (de minimis fish mortality). According to NYSDEC, a proposed intake design consisting of wedge-wire screens with 2 mm slot width, and an approach velocity of no more than 0.5 feet per second: "1) should kill essentially no viable fish from impingement, 2) will exclude larger fish eggs, [and] 3) potentially may entrain some thread-like icthyoplankton smaller than 20 mm in length, if such ichthyoplankton occur in the source water body." September 1998 NYSDEC Comments, at 3. Moreover, as discussed supra, the Project's wedge-wire screens will have slot widths of only 0.5 mm - a significant technological improvement over what NYSDEC would have accepted two years ago as BTA.

SEF urges EPA to evaluate comprehensively the "suite of technologies" now available for minimizing impingement and entrainment effects.

EPA Response

EPA has evaluated all technologies that are available to minimize adverse environmental impact. In

developing the regulatory framework that is presented in the final rule, EPA is both requiring that facilities reduce impingement and entrainment to an equivalent level as that which can be achieved by meeting the Track 1 requirements. In addition, further controls are required to prevent facilities from taking a large proportion of the waterbody flow. EPA believes the combination of these requirements is best technology available for minimizing adverse environmental impact. However, EPA is not dictating the specific technologies with which a facility must meet these requirements. EPA believes that better controls can be implemented to minimize impingement and entrainment by letting the facility evaluate site specific conditions when choosing appropriate technologies.

EPA chose the two MGD threshold based on the determination that a large majority of the facilities in all industrial categories would be covered under the rule and that EPA has a record basis upon which to determine what requirements could be met by these facilities in terms of technical availability, economic achievability, and acceptable non water quality environmental impacts. Below this threshold, section 316(b) of the CWA applies, but EPA believes that the question of best technology available should be determined by the permitting authority on a case-by-case basis. In other words, EPA has too many questions, particularly about economic practicality to address flows below 2 MGD on a national basis.

Comment ID 316bNFR.025.009

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

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EPA Has Not Analyzed the Cross-Media Effects of the Proposed Regulations

Section 316(b) directs EPA to ensure that cooling water intake structures minimize adverse "environmental impacts." Congress's mandate is broader than the entrainment and impingement impacts upon which EPA has focused in the proposed regulation. SEF urges EPA to consider the following effects of the cooling tower technology EPA appears to favor: (1) increased air emission due to the “energy penalty” exacted by closed-cycle cooling, or dry cooling; (2) noise; (3) visible plumes that (a) are unaesthetic, and (b) contribute to increased fogging and icing on nearby roadways; and (4) salt drift.

Of all the technologies associated with cooling condenser water, once-through technology is the only one that is not associated with increased air emissions. The other cooling water technologies either directly emit contaminants into the air and/or indirectly result in an increase of fuel use and air emissions due to the loss of electrical generation capacity by the power used to operate these technologies. Although moving the sources away from potential receptors by increasing stack height or increasing the physical area surrounding the Facility may mitigate these additional impacts, these options are rarely available for urbanized locations because of space and land use limitations. In essence, the proposed regulations pre-determine that air and noise impacts are more acceptable than impacts to aquatic resources and water quality. Paradoxically, the locations least likely to be able to comply with the standards, like those in urban area, are also the most likely to have impaired air quality. More to the point, however, Congress asked EPA to ensure that cooling water intake structures minimized their effects on all adverse environmental impacts. The proposed regulations fall short of that goal.

EPA Response

See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Comment ID 316bNFR.025.010

Subject Matter Code	9.4
Adverse Environmental Impact	

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EPA Must Define “Adverse Environmental Impact”

Peculiarly, EPA has so far declined to define "adverse environmental impact." 65 Fed. Reg. at 49074-49075. In view of the fact that section 316(b) specifically directs EPA to ensure that cooling water intake structures minimize "adverse environmental impact," EPA's failure to define expressly the term is difficult to understand. Nearly 25 years ago, EPA indicated that a necessary first step in a section 316(b) analysis was determining whether there was adverse environmental impact. See BTA Development Document, App'x B at 222. Despite its reluctance to define the term, however, EPA has implicitly signaled that any impact is adverse. By imposing a categorical and rigid system, in which specific sites and impacts are not evaluated, EPA has apparently determined that “one fish = adverse environmental impact."

But that cannot have been Congress's intention. Congress directed EPA to minimize, not eliminate, adverse environmental impact. 33 U.S.C. § 1326(b). Interpreting the loss of one, or even a few, fish as "adverse environmental impact" would read "minimize" out of the statute, and "eliminate" in. SEF urges EPA to define expressly "adverse environmental impact," and to define it in a way that honors Congress's intent.

Specifically, SEF adopts the position set forth in the Comments submitted by the Utility Water Act Group ("UWAG") on the proposed regulations. SEF agrees with UWAG that "adverse environmental impact" should be defined in a way that makes clear that the goal is to avoid adverse impacts on species at the population level. SEF incorporates by reference UWAG's proposed definition of "adverse environmental impact" and the reasons set forth in support of the definition.

EPA Response

EPA does not believe that cooling water intake structures result in the loss of one or a few fish, shellfish, or larvae. This argument is specious. Please see responses to comments 316bNFR.507.004, 316bNFR.014.013, 316bNFR.014.019, and the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Stuart I. Gansell

On Behalf Of:

Pennsylvania Dept. of Environmental Protection

Author ID Number:

316bNFR.026

Comment ID 316bNFR.026.001

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Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code CP

Comment Period

We would also welcome the same opportunity to participate in an ongoing dialogue, and to comment on future rulemakings as well as other changes in program guidance and regulatory revisions that will result from these proposed regulations.

EPA Response

In the development of this rule, EPA's practice has been and will continue to be to meet with any stakeholder who requests a meeting to discuss this rulemaking effort and the resulting implementation guidance.

Comment ID 316bNFR.026.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Stuart I. Gansell

Organization Pennsylvania Dept. of Environmental Protection

The proposed rulemaking for cooling water intake structures at new facilities and resulting regulatory and program revisions will have an immediate impact on at least one known proposed facility in Pennsylvania, which is a combined cycle generation facility currently in the planning stages of development. While it is difficult to predict with any certainty, we anticipate that other new cooling water intake structures will be needed as other proposed projects for new facilities develop in the future. Therefore, the proposed rulemaking may impact current regulations, policies, and procedures in Pennsylvania that previously were administered through the NPDES program on a case-by-case basis, and which relied heavily on using best professional judgment.

EPA Response

The final rule establishes national technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities. The national requirements establish the best technology available for minimizing adverse environmental impact associated with the use of these structures. This rule does not apply to existing facilities and EPA may make different choices in the existing facilities rules.

Comment ID 316bNFR.026.003

Subject Matter Code SUP

General Statement of Support

Author Name Stuart I. Gansell

Organization Pennsylvania Dept. of Environmental Protection

General Comments

The Department, in the absence of final regulations and guidance, has been using the 1977 Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500 on a case-by-case basis applying best professional judgment for evaluating cooling water intake structure impacts in Pennsylvania. while we believe this approach has generally provided adequate protection to date, we also generally believe the new regulations will provide consistency and an improved understanding of the requirements for all parties involved since the proposal establishes national performance standards on the location, design, construction, and capacity of cooling water intake structures at new facilities. This will assist the regulated community and the permitting and enforcement authorities in minimizing adverse environmental impacts associated with the cooling water structures at these facilities.

EPA Response

EPA agrees that the new regulations will provide consistency and aid in minimizing adverse environmental impacts associated with cooling water intake structures.

Comment ID 316bNFR.026.004

Subject Matter Code MISC

Miscellaneous Comment

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Organization Pennsylvania Dept. of Environmental Protection

We would emphasize, however, that the resulting regulations and program guidance not be overly prescriptive, but allow for sufficient flexibility to address case-specific concerns when necessary. The Department, therefore, encourages EPA to develop cooperative, common-sense approaches, that promote program flexibility while maintaining water quality protection to meet the unique needs and conditions being faced by the States/tribes and the regulated community.

EPA Response

Please see response to comment 316bNFR.023.011 and the preamble to the final rule.

Comment ID 316bNFR.026.005

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 2.2

Obligation Under 316(b)

A. What is the Purpose of Today's Proposed Regulation?

This rulemaking would amend EPA's NPDES permitting regulations at 40 CFR part 125, including reinstating references to 40 CFR part 125 subparts I and J in 40 CFR 123.25(a)(36). While the Department has been implementing a Section 316(b) program on a case-by-case basis, authority to do so has been challenged on numerous occasions. This proposal would establish a stronger foundation and further support Pennsylvania's NPDES program as having legal authority to implement final regulations addressing cooling water intake structures not only at new but also existing facilities.

EPA Response

EPA agrees that the approach taken in the final rule will facilitate permitting decisions for new facilities.

Comment ID 316bNFR.026.006

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 5.1

Requirements Established under the Proposed Rule

We also support the proposed provisions that conditions implementing Section 316(b) continue to be included in NPDES permits; and as now being proposed that the information required regarding the intake structure and requests for alternative requirements be submitted at the time of permit application.

EPA Response

No response necessary.

Comment ID 316bNFR.026.007

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Stuart I. Gansell

Organization Pennsylvania Dept. of Environmental Protection

V. Scope and Applicability of the Proposed Rule

C. What is a “Cooling Water Intake Structure”?

The Department welcomes the clarifications provided by the proposed definition that a cooling water intake structure is the total physical structure and any associated constructed waterways used to withdraw water from a water of the U.S., provided that at least 25 % of the water withdrawn is used for cooling purposes. The definition also clarifies that the cooling water intake structure includes the physical structure and associated technologies that extend to the first intake pump or series of pumps.

The definition of a cooling water intake structure also applies to water being brought in for both contact and non-contact cooling purposes. This new definition would not differentiate between the purposes for which the cooling water has been withdrawn or how it will be used once it is withdrawn. We can agree on this approach, as long as it does not result in revisions to the current approach established that address the different discharge requirements in the NPDES program for contact versus non-contact cooling waters.

The Department currently supports EPA’s selection of twenty five (25) percent as a reasonable threshold for the percent of flow intended for use as cooling purposes in conjunction with the 2 mgd total flow threshold.

EPA Response

The final rule defines "cooling water intake structure" to mean the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps. EPA has not changed the twenty-five (25) percent threshold, but has placed the threshold in the applicability requirements of the final rule. In addition, in the final rule EPA has clarified the definition of "cooling water" to mean water used for contact or noncontact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content.

EPA does not anticipate that the definition of "cooling water intake structure" in today's rule will result in conflict with any current NPDES discharge requirements for contact versus noncontact cooling water.

Comment ID 316bNFR.026.008

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 7.3

Definition: Waters of the US

D. Must My Facility Withdraw Water From Waters of the U.S.?

We are concerned, and would likely oppose EPA's blanket inclusion of cooling ponds as "waters of the U.S. if they meet the criteria at 40 CFR 122.2" without further explanation on how this would be applied. How much discretion on making such determinations will be placed in the Director's control?

EPA Response

See Response to Comment 316b.NFR.068.151.

Comment ID 316bNFR.026.009

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Stuart I. Gansell

Organization Pennsylvania Dept. of Environmental Protection

We believe that some discretion should be afforded to allow states to implement the provisions of this proposal, on a case-by case basis using best professional judgment, where appropriate, for withdrawals with very small total flows (< 2 mgd threshold), but that constitute a relatively large percentage of a waterbody at critical low flow. Conversely, however, we agree with the Agency's suggestion that a higher total flow threshold (such as 10 mgd) might be appropriate for withdrawals that constitute a relatively small percentage (10 %) of a waterbody at critical low flow.

EPA Response

EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ.

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

No flow threshold has been added to the applicability provisions; proportional flow limits exist in the rule.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.026.010

Subject Matter Code	7.5
Applicability to Facilities Subject to NPDES Permit	

Author Name Stuart I. Gansell

Organization Pennsylvania Dept. of Environmental Protection

E. Must My Facility Have a Point Source Discharge Subject to an NPDES Permit?

This proposal is said to apply only to facilities that are required to have an NPDES permit for direct discharge to surface waters, and that the Director should apply other legal requirements such as Section 404, 401 of the CWA, CZM Act, NEPA, or other similar state authorities to address adverse environmental impacts caused by significant cooling water withdrawals at intake structures/facilities not subject to a NPDES permit. While we acknowledge that other CWA legal authorities/requirements are available to the Director/States, we also recognize that some facilities may attempt to intentionally restructure their operations/ownership of a new facility to separate control of the cooling water intake structure from the portion controlling the NPDES discharge in order to avoid the requirements of this regulation or these other regulatory authorities. Therefore, some level of discretion should allow States to invoke provisions of this proposal, on a case-by-case basis and where appropriate, if it is determined that the intake facility and other new facilities which are controlled and/or owned by separate entities, or are not subject to an NPDES permit, should be examined in their entirety. The same should be true for facilities that have only General Permits or no NPDES permit because they are part of a larger multi-user group of a withdrawal facility, and/or connected to municipal or private water suppliers, or that discharge heated wastewater to a municipal or other treatment facility.

EPA Response

EPA agrees with the commenter that some facilities may try to circumvent the application of today's final rule requirements. For that reason EPA has amended 125.81 and added 125.81(b) so as to include those facilities which may obtain cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States. See preamble section VI.A.4 for further discussion of this issue. See also preamble section V and response to comment 316bNFR.026.012 for discussion of state authorities. EPA points out that under 125.80(c) of today's rule, new facilities that do not meet the threshold requirements regarding amount of water withdrawn or percentage of water withdrawn for cooling water purposes in 125.81(a) must meet requirements determined on a case-by-case, best professional judgment (BPJ) basis.

EPA intends today's rule to apply to those facilities that have or require an NPDES permit for storm water only. If such permit is a general permit, EPA acknowledges that an individual permit may need to be issued containing conditions implementing this final rule's requirements. See preamble section I.D for a discussion of the applicability of today's rule.

Finally, EPA notes that today's final rule does not apply to those new facilities obtaining cooling water from a public water system. Similarly, if a new facility is not required to obtain an NPDES permit

because it discharges its wastewater (including, but not limited to cooling water) to a municipal facility, it is not subject to the requirements of today's rule.

Comment ID 316bNFR.026.011

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 9.2

Types of Environmental Impacts Caused by CWIS

VII. Environmental Impact Associated with Cooling Water Intake Structure

B. What Types of Environmental Impacts Are Caused by Cooling Water Intake Structures?

The Department agrees with the Agency that the proposed regulations (at §125.84(g) although §125.84(f) is referenced in the preamble of this proposal) should address the effects and environmental impacts associated with the construction of new cooling water intake structures even though these impacts may not be recurring.

EPA Response

The Agency stresses that it is addressing adverse environmental impact associated with cooling water intake structures in the rulemaking and has commented further on this matter in sections III and VI.B of the Preamble.

Comment ID 316bNFR.026.012

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 16.1

Discretionary Options Available to the Director

We also agree with the provisions set forth in Section 125.84(f) giving the Director the authority to include more stringent requirements in the permit to minimize impingement and entrainment as a result of effects of multiple cooling water intake structures in the same body of water, seasonal variations in the aquatic environment affected by the intake structure, or the presence of regionally important species.

EPA Response

EPA modified the requirements in the final rule from that which was proposed in order to provide for more certainty in Track 1 on order to expedite permitting and to reflect the policy decision that the Track 1 requirements represent an appropriate set of controls that reflect best technology available for minimizing adverse environmental impact. EPA agrees that under section 510 of the CWA, states may always require more stringent controls. Today's final rule will not interfere with that authority. See preamble section V.

Comment ID 316bNFR.026.013

Author Name Stuart I. Gansell

Organization Pennsylvania Dept. of Environmental Protection

Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

D. What Constitutes Adverse Environmental Impact Under This Proposed Rule?

The Department has also long maintained that the objective of Section 316(b) is often perceived to be more protective than that of Section 316(a) since on certain occasions the Department had identified elements of adverse environmental impact from the location and/or operation of the cooling water intake while the same facility demonstrated that they continued to protect and propagate a balanced indigenous population of shellfish, fish, and wildlife in the vicinity of the waterbody affected by their heated wastewater discharge.

EPA Response

EPA agrees that 316(b) objectives should not be connected to those of 316(a) and that AEI is not governed by 316(a). The CWA does not compel EPA to link 316(b) adverse environmental impact to the objectives of 316(a) of the Act (i.e., balanced indigenous population). Please see responses to comments 316bNFR.068.007 and 316bNFR.068.008. EPA believes that the choice by Congress of different terms in section 316(b) versus 316(a) can be presumed to be intentional and purposeful. Bates v. U.S., 522 U.S. 23 (1997). Please see section VI.B.2.a. of the preamble to the final rule for EPA's interpretation of AEI.

Comment ID 316bNFR.026.014

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

The Department, therefore, welcomes the clarifications provided by the proposed definition of the third alternative that adverse environmental impact takes an approach where the level of protection is analogous to that provided by EPA's criteria methods for protecting aquatic life from toxic effects, particularly from acute lethality. However, the Department believes this concept should be further developed in the guidance rather than as part of the regulation. We would recommend that, at this time, EPA only reference in the regulation that adverse environmental impact is considered to be a level of impingement or entrainment of aquatic organisms that is recurring and/or non-trivial.

EPA Response

Please see response to comment 316bNFR.040.003.

Comment ID 316bNFR.026.015

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

We agree with the Agency that, at a minimum, Section 316(b) should provide protection of 1) threatened, endangered, or otherwise listed species; 2) socially, recreationally, and commercially important species; and 3) the protection of community integrity, including overall structure and function to support that community.

EPA Response

Please see response to comment 316bNFR.029.013 and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.026.016

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

We do not believe, however, that EPA should specifically (emphasis added) define adverse environmental impact more broadly to include considerations for non-aquatic environmental impacts. We do believe, however, that the regulation, (and probably more specifically in the guidance), allow states, permitting authorities, and facility operators to have sufficient flexibility to consider non-aquatic impacts that may result from activities related to the design, construction, location and operation of an intake structure and other alternative technologies as having a harmful effect on air, lands and other natural resources when making Section 316(b) decisions.

EPA Response

For the final rule, EPA interpreted adverse environmental impact to include a broad range of impacts that result from the operation of cooling water impact structures. As the same time, as it does in establishing NSPS and BAT for existing facilities, EPA considered the non-water quality environmental impacts of the technologies that formed the technology basis of the regulations. See response to comments 316bNFR.068.100 and 316bNFR.014.019. It is the Agency's determination that the non-aquatic impacts of the technology-based performance requirements of the final are acceptable and not significant.

By not including specific requirements on location, such as distance from shoreline and/or littoral zones (as proposed), the Agency has increased the flexibility for facilities and permitting authorities to minimize local siting issues associated with new cooling water intake structure construction. In addition, the final rule includes a two-track framework that may allow for local issues as mentioned by the commenter to be met through flexible compliance pathways.

Comment ID 316bNFR.026.017

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 10.01

Regulatory Framework Options

VIII. Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities

The Department supports the establishment of national minimum performance requirements for the location, design, construction, and capacity of cooling water intake structures at new facilities to minimize adverse environmental impact. We further support the proposed rule because these requirements are based on the category or type of waterbody in which the intake structure is located, the general location of the intake structure within that waterbody, the volume of water withdrawn, and the design velocity at the intake structure.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification concept based on legitimate concerns brought up by commenters about definitions and complexities of national application. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the estuarine). EPA believes this is more reasonable from an implementation standpoint. Under the Track II option there are design intake flow requirements that are still based on waterbody categories (see Section 125.84)

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.026.018

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 11.0

Best Technology Available-Location

We agree with EPA that the location of a cooling water intake structures in probably the most important factor in addressing the adverse environmental impact caused by cooling water intakes.

EPA Response

EPA agrees that location is an important factor in addressing cooling water intake structure impacts. However, after reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.026.019

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 12.0

Best Technology Available-Flow and Volume

The design and capacity of the intake structure are also important in that they affect the velocity or speed at which water passes through the screens or other barriers at the entrance to the cooling water intake structure, which, in turn, creates the forces responsible for impingement and/or entrainment of organisms found in the vicinity of the intake structure.

EPA Response

EPA agrees with the commenter.

Comment ID 316bNFR.026.020

Author Name	Stuart I. Gansell
Organization	Pennsylvania Dept. of Environmental Protection

Subject Matter Code 10.01

Regulatory Framework Options

This proposed regulation and any resulting guidance should set minimum technology-oriented performance requirements, but it should not prompt the EPA or State permitting authorities to mandate the use of any specific technology, or endorse any given process and/or product.

EPA Response

In the final rule, is establishing the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Thus, EPA is setting minimum technology- oriented performance requirements but does not mandate the use of any specific technology or endorse specific process or product.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Edward M. Keith

On Behalf Of:

NRG Energy, Inc.

Author ID Number:

316bNFR.027

Comment ID 316bNFR.027.001

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code EXIST

Existing Facility Rule

NRG also maintains an interest in potential new facilities, and for that reason as well as our concern that rules promulgated for new intakes may inevitably trickle down to proposed rules for existing facilities, has elected to comment on the subject rulemaking proposal.

EPA Response

EPA will respond to all comments and reiterates that rules for new and existing sources will be developed separately.

Comment ID 316bNFR.027.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Additionally, we are concerned that work we are currently negotiating and budgeting to undertake in good faith pursuant to states NPDES renewal procedures may ultimately be preempted and relegated to fruitlessness once states are obliged to adopt some or all of the rules promulgated by the U.S. Environmental Protection Agency (EPA) over the next several years.

EPA Response

EPA disagrees that all work related to negotiating NPDES renewal procedures may ultimately be preempted by this rulemaking. The final rule being promulgated today in no way affects permit proceedings or previously issued permits which continue to be governed by existing legal authorities. Please see response to 316bNFR.024.003

Comment ID 316bNFR.027.003

Subject Matter Code EXIST

Existing Facility Rule

Author Name Edward M. Keith

Organization NRG Energy, Inc.

The proposed rules could have a significant impact on NRG Energy, Inc. and many other power producer's ability to site new facilities to meet the growing regional demand for electricity. Developing proposed rules for existing facilities based on these proposed rules for new facilities could have a much greater impact on power producer's ability to meet existing and projected demand for electricity across the country.

EPA Response

EPA disagrees with the commenter's assertion that the final rule will have a significant impact on the ability of the commenter's company to site new facilities to meet the growing regional demand for electricity. With regard to the commenter's assertion regarding existing facilities, EPA cannot respond to this assertion at this time. This issue will be addressed in the phase II rulemaking involving existing sources.

Comment ID 316bNFR.027.004

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 7.1

Definition: New Facility

What Is a New Facility?

The wording in this section is rather confusing in that EPA states that modifications to existing facilities would not be covered under this rule yet also states that modifications resulting in increased capacity would be covered. Applying the new facility standards to existing facilities could discourage utilities from upgrading the efficiency of their existing facilities, if they would need a small appropriation increase, because they would be required to meet new facility standards. The incremental increase in impact would seem to be much less for a small capacity increase than it would be to build a new facility or even a new intake structure. Increasing efficiency at existing facilities should be encouraged rather than penalized.

EPA Response

Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule. Thus, the rule allows for numerous types of changes that would increase efficiency, while defining new facilities in a manner consistent with existing NPDES definitions addressing new sources and new dischargers.

Comment ID 316bNFR.027.005

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Edward M. Keith

Organization NRG Energy, Inc.

What Is a Cooling Water Intake Structure?

While defining a cooling water intake structure as all of the physical structures and technologies up to the first set of pipes may be suitable in the majority of cases there may very well be exceptions. In western states where water is a commercially valuable commodity cooling water may be withdrawn from such sources as irrigation systems or other water conveyance systems and defining these networks as cooling water intake structures would be very cumbersome and unwieldy to regulate. This would be particularly problematic if the proposed rule were applied where the regulatory trigger for the percent of water used for cooling was reduced to 5 percent of the total capacity.

EPA Response

The final rule defines "cooling water intake structure" to mean the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps. EPA has not changed the twenty-five (25) percent threshold, but has placed the threshold in the applicability requirements of the final rule. Cooling water intake structures below this threshold are not subject to the final rule; however, permit writers should determine any appropriate section 316(b) requirements for structures withdrawing less than 25 percent of intake flow for cooling purposes on a case-by-case basis.

How the definition of "cooling water intake structure" is applied to a particular facility should be based on consultation between the permittee and the permitting authority. In determining whether an irrigation ditch or other water conveyance system is part of the cooling water intake structure, the permitting authority is to consider whether the structure or constructed water way is used to withdraw water from the source waterbody (which must be a "water of the U.S.") into the cooling water system. See 125.83. If the commenter is concerned about a specific case. The information provided is not detailed enough for EPA to opine on the status of the water conveyance system in issue.

Comment ID 316bNFR.027.006

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Must my Facility Withdraw Water From Waters of the U.S.?

EPA states that with a capacity trigger of 2 MGD the regulation would cover 99.97 percent of cooling water flows. EPA also states that if the trigger flow was increased to 25 MGD the regulation would still address 99.1 percent of cooling water flows. Thus an order of magnitude increase in the capacity trigger would result in a reduction of less than one percent of cooling water flows being regulated. Does the workload increase at EPA generated by the 2 MGD flow trigger justify including less than one percent of additional cooling water flows? Do these percentages apply to planned new facility intake capacity or to existing facility intake capacity? EPA later states in Section VII.A. that of the known planned new generating facilities potentially regulated by this rule none were projected to use more than 20 MGD. Why is EPA using existing facilities to determine potential impact of a rule to regulate new facilities?

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow (estimated total flow is approximately 9 billion gallons per day) and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

The two MGD threshold applies to new facilities. Existing facilities will be addressed under Phase II and III regulations.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.027.007

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Environmental Impact Associated With Cooling Water Intake Structure

What Constitutes Adverse Environmental Impact Under this Proposed Rule

If the measure of the rule is to minimize adverse environmental impact it seems that a definition of adverse environmental impact is critical to the enforcement of the rule. EPA offers several alternatives for determining adverse impact. In the first case listed entrainment or impingement of more than one percent of the aquatic organisms in the near field would be considered adverse. Yet there is no discussion of the probability of returning those organisms to the source water alive and healthy through modern screening technology. Larval fish are highly susceptible to impingement and entrainment yet their first year survival in many cases is less than one percent. Does it really impact a community to take one percent or less of a population where survival is extremely low even without considering human induced impacts? Adverse environmental impact should be defined as measurable impacts affecting aquatic populations or communities not impact to individual organisms. For new facilities, assessment of pre-construction conditions would provide a basis for comparison of operational impacts.

EPA Response

Please see responses to comments 316bNFR.029.013 and 316bNFR.507.004.

EPA agrees that assessment of pre-construction conditions will be critical for identifying potential operational impacts. Under today's Track II option, a comprehensive demonstration study, including physical and biological data, must be conducted by the facility to characterize the aquatic environment in the vicinity of the proposed intake.

Comment ID 316bNFR.027.008

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 10.13

Request for Comment: Uniform Set of Standards Applicable to All Facilities

Best Technology Available (BTA) for Minimizing Adverse Environmental Impact at New Facilities

What Is the Best Technology Available for Minimizing Adverse Environmental Impact at New Facilities

What Are the Proposed and Alternative Regulatory frameworks for Today's Proposed Rule?
EPA describes several optional frameworks for how the rule would be designed. The first proposal involves setting national minimum standards for cooling water intakes based on type of source water body, location of the intake in the water body, the volume of water withdrawn, and the design intake velocity. The sensitivity of the water body and/or the specific location of the cooling water intake would determine the specific impingement and entrainment reduction measures required. The promulgation of national standards may make permitting more straightforward and make permit conditions more uniform across the nation, as well as ease the workload on permitting agencies. Given the wide variability in water body types, cooling water intake needs and technologies, and the diversity of aquatic communities across the nation one national standard would severely limit the flexibility required to achieve optimum operational needs within reasonable cost restraints.

EPA Response

See response to 316bNFR.008.010. The two-track approach in the final rule provides substantial flexibility for new facilities to consider costs in deciding between compliance under Track I or Track II, as well as to optimize their cooling water intake structure technologies in a cost-efficient manner if they comply under Track II.

Comment ID 316bNFR.027.009

Subject Matter Code MISC

Miscellaneous Comment

Author Name Edward M. Keith

Organization NRG Energy, Inc.

The ability to meet a national standard could eliminate numerous bodies of water from consideration in areas sorely in need of additional generation.

EPA Response

The commenter has not provided any specific information about what the problems of the rule are with respect to siting implications. EPA's record demonstrate that the costs of the rule, based on a cost:revenue analysis are economically practicable and that the technologies upon which the rule is based are technically achievable. EPA analyzed the potential siting implications of the proportional flow requirements and determined that within the United States approximately 53,964 river miles could support a large non-utility power-producing facility withdrawing 85 MGD, and approximately 14,542 river miles could support a large utility plant requiring 700 MGD without exceeding of the proportional flow limitations in this rule. Under today's final rule, new facilities needing additional cooling water in other areas would need to supplement withdrawals from waters of the U.S. with other sources of cooling water or redesign their cooling systems to use less water. For example, a facility could use groundwater, municipal sources of water, treated wastewater (gray water), or locate on waterbodies that can meet the proportional flow requirements.

In the case where the evaporation of groundwater or surface water through cooling tower operation may be a concern, EPA notes that not all the gallons of groundwater used by the facility is actually consumed due to evaporation. A portion is discharged as "blow-down" to maintain the quality of the water being recirculated. EPA also notes that according to detailed research conducted by the Nuclear Regulatory Commission, a once-through cooling system has consumptive water use issues on the order of 60 percent of the levels lost in recirculating wet cooling towers. EPA studied the water consumption levels expected as a result of this rule and found them to be small for the national. For instance the electricity generation industry would see only a 0.1 percent increase in water consumption as a result of the rule. New electric generating capacity within the scope of the rule would experience an increase of 2.7 percent water consumption due to evaporation as compared to projected baseline evaporation rates. See Chapter 3 of the Technical Development Document.

Comment ID 316bNFR.027.010

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

The historical approach using a case by case determination offers the permittee some degree of flexibility in cooling water intake siting and design but yields less uniformity in permit conditions and increases the permitting agency workload. The establishment by EPA of decision criteria to guide a case by case approach would retain much of the flexibility in permitting but could increase the uniformity of permit conditions by following the a uniform set of decision criteria.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.027.011

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

The development of a rebuttable presumption that a given set of uniform national requirements reflect BTA yet allow the facility the option to demonstrate they can meet the minimal adverse impact criteria through other means may be a reasonable compromise. This method would provide a degree of uniformity in permit conditions, allow the permittee needed flexibility, and limit agency workload.

EPA Response

See responses to comments 316bNFR.009.004 and 316bNFR.068.001.

Comment ID 316bNFR.027.012

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The use of dry cooling systems could be an alternative for reducing impact on aquatic organisms. However making it the national standard would unnecessarily limit siting options due to the physical space requirements for this type of cooling towers.

EPA Response

EPA considers the additional land area requirements of dry cooling to pose some economic problems for new facility power plants. As discussed in Chapter 4 of the Technical Development Document, EPA found that dry cooling systems can have significantly larger land area needs than comparably designed wet cooling towers. However, EPA does not consider the land area issue to be one that factors into its decision to reject dry cooling for new facilities. EPA conducted sensitivity analyses on the costs of the final rule for land area increases at select new facility power plants and determined that the costs were not sensitive to moderate changes in land area needs. As such, dry cooling systems would likely not pose a dramatic economic effect based on increased land area requirements alone. The more compelling reasons for rejecting dry cooling are discussed in detail in Section V.C of the preamble to the final rule.

Comment ID 316bNFR.027.013

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 10.12

Request for Comment: Best Technology Available Requirement "Trading"

EPA considered an alternative allowing the ability to trade among various technology components of BTA to achieve equivalent reductions in adverse environmental impact. The approach would provide facility owners with needed flexibility to meet requirements by compensating for one technological fix by over-compensating on another technology but still achieving the same impact reduction goal.

EPA Response

See response to 316bNFR.008.009.

Comment ID 316bNFR.027.014

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

EPA also considered a tiered process for permitting cooling water intake structures and other site specific alternatives that would offer some flexibility to facilities depending upon their willingness to conduct studies to determine if impacts may occur and to what extent impact reduction technology would be required. Providing facility owners with the ability to determine their own options to achieve impact minimization goals allows them to work with all aspects of the proposed project to come up with the most reasonable combination of solutions for their given situation.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. The rule allows facility owners to choose between the clear requirements of Track I and the potentially greater time and effort, but broader flexibility to work with all aspects of the proposed project, offered under Track II.

Comment ID 316bNFR.027.015

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Location

EPA proposes to regulate the siting of cooling water intake structures by requiring increasingly stringent protection for the littoral zones (or other sensitive areas) of the source water body. EPA defines littoral zone as that region along the shoreline that supports submerged aquatic vegetation or to that portion of the substrate that receives one percent of incident light. In non-tidal rivers submerged vegetation may be affected by current velocity as much as by light penetration and, in addition, the depth to which one percent of incident light penetrates can vary significantly by season. The definition of littoral zone needs to be refined to provide facilities with a more reliable indicator of the extent of the littoral zone.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent comparable performance in a given waterbody to reduce fish and shellfish impacts using alternative technologies or approaches, for intake capacity and velocity.

Comment ID 316bNFR.027.016

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name Edward M. Keith
Organization NRG Energy, Inc.

Flow and Volume

Nowhere in the discussion of velocity or flow volume does EPA discuss screening methods that can protect aquatic organisms at higher velocities and flows. EPA does discuss the suitability of these technologies under Section VIII.A.5. Additional Design and Construction Technologies. Intake screen systems can be designed to handle higher velocities and especially greater volumes yet filter out organisms and return them to the source water body in a condition that they can survive. Flexibility in the regulations allowing a combination of technologies to meet a given target would provide cooling water users with options in designing intake structures.

EPA Response

EPA has provided ample evidence supporting its belief that high intake volumes and velocities can be harmful to some aquatic species, especially poor swimmers (see 2-028A-D and 2-029 in the Docket). Examples of technologies which may be capable of meeting the standards of today's final rule are presented in the Technical Development Document for today's final rule. EPA is not endorsing or recommending any specific technology or suite of technologies but rather providing examples that support a technology-based approach to reducing environmental impacts from cooling water withdrawals.

EPA believes the two track approach presented in today's final rule affords cooling water users adequate flexibility in meeting the standards. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

Comment ID 316bNFR.027.017

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 22.1

CWIS Impacts and Benefits

Setting maximum facility volume based of the flow of the source water body may be appropriate in many situations. EPA states that based on their numbers 18,000 river miles could support a large utility generating plant's water needs. The distribution of these river miles is not discussed and the lack of suitable river reaches in some regions could eliminate or greatly reduce the possibility of meeting regional electrical power needs.

EPA Response

EPA has considered the commenter's concern but based on its record of the performance of exiting facilities disagrees that lack of river reaches suitable facility siting in some regions could eliminate or greatly reduce the possibility of meeting regional electrical power needs.

To further examine the potential siting implications of the final rule for new facilities, EPA reviewed data on water use by existing facilities in arid regions of the country. The Agency found that 80 percent of the existing facilities in Arizona, California, Nevada, New Mexico, Oklahoma, and Texas do not use waters of the U.S. in their operations, indicating that new facilities in these areas would similarly use waters other than waters of the U.S. in their operations. Therefore, the final rule would not affect these facilities if they were being constructed as new facilities subject to the rule. For more information on EPA's analyses regarding potential effects of this rule on facility siting, please see the preamble to the final rule.

Comment ID 316bNFR.027.018

Subject Matter Code 13.1

Requirement of 0.5 fps

Author Name Edward M. Keith

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Velocity

The Sonnichsen study cited by EPA found that an intake velocity of 1.0 ft/s was protective for the species studied. EPA then applied a safety factor of two, reasoning that should be protective for most fishes, and developed a national standard threshold of 0.5 ft/s. EPA goes on to state that two different velocities were considered; approach velocity and through screen (technology) velocity. Approach velocity was defined by EPA as having the most influence on aquatic organisms and their ability to escape impingement or entrainment. EPA goes on to state that through screen velocity will always be greater because of the reduced open screen area. EPA proposes to use through screen velocity as the criteria even though approach velocity has been the standard for years and already has a built in safety factor of two. EPA also states that 0.5 ft/s may be overly protective for some species and not protective enough for other species. Does it then make sense to set a national standard given the wide range of suitable velocities that might achieve the goal?

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Also, EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

Comment ID 316bNFR.027.019

Subject Matter Code	15.13
Discretionary/Voluntary Approaches	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

What Is the Role of Restoration Measures?

Restoration measures are a valid tool for minimizing impact to aquatic communities. Discretionary and voluntary restoration would be the preferred approach. The implementation of restoration measures could provide compensation where other impingement or entrainment reduction measures were not feasible, cost prohibitive, or could not achieve the desired goal. A system of restoration banking would offer facilities another viable option for meeting their impact minimization goals. Restoration measures could be an especially effective tool to deal with minimizing impacts to specific or important species.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II. Regarding restoration banking, see 316bNFR.008.012.

Comment ID 316bNFR.027.020

Subject Matter Code	16.2
Request for Comment: Establishing Alternative Requirements	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Additional and Alternative BTA Requirements

EPA proposes to allow the Director to set alternative BTA requirements that are less stringent than the national requirements but only if compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during rule development. By not comparing the costs of the technology to the environmental benefit gained EPA is forcing facilities to incur significant costs for questionable environmental gains. In addition, technology costs can increase significantly especially when that technology is being required. There must be a mechanism for periodic re-evaluation the cost numbers for them to remain realistic.

EPA Response

EPA disagrees with the approach suggested by the commenter for a variance from the new facility requirements based on a cost benefit approach because this approach would in essence provide a different less stringent standard under the variance than applies for the requirements of the rule. As stated and explained elsewhere in the rulemaking record, EPA has adopted a technology-based approach to the new facility rule analogous to that taken for new source performance standards under section 306 of the CWA. New sources have the best opportunity to install the best and most efficient production processes and intake structures. Under section 306, Congress directed EPA to consider the best demonstrated process changes, in plant controls and end of process controls to reduce discharges to the maximum extent feasible. As discussed, elsewhere in the comment response document, EPA believes it is reasonable to interpret section 316(b) to authorize technology-based controls, which has chosen to do in this new facility rule. In the technology-based effluent limitations guidelines and standards program, it is well-established that EPA need not conduct a cost benefit balancing in establishing best available technology (BAT) or best demonstrated control technology (NSPS). See e.g., CPC Intern., Inc v. Train, 540 F.2d 1329, 1341-42 (8th Cir. 1975); American Iron and Steel Inst. v. EPA, 526 F.2d 1027, 1059 (3rd Cir. 1975). Instead, EPA considers whether the costs can be reasonably borne by this industry, or the economic achievability of the requirements. See Responses to Comment 068.007, 068.008 and 206.014. In other words, under a technology-based approach, EPA is not required to demonstrate receiving water quality benefits. Weyerhaeuser v. Costle, 590 F.2d 1011, 1042 (D.C. Cir. 1978). The purpose of the technology-based approach was articulated by the Court as follows:

They make clear that based on long experience, and aware of the limits of technical knowledge and administrative flexibility, Congress made a deliberate decision to rule out arguments based on receiving water capacity. . . . The earlier version [of the CWA] was passed in 1948 and amended five times before 1972. Throughout that 24 year period, Congress attempted to use receiving water quality as a basis for setting pollution standards. citation omitted. At the end of that period, Congress realized not only that its water pollution control efforts until then had failed, but also that reliance on receiving water capacity as a crucial test for pollution levels had contributed greatly to that failure. EPA v.

State Water Resources Control Board, 426 U.S. 200, 202 (1976). Based on this experience., Congress adopted a new approach in 1972 . . . This new approach reflected developing vies on practicality and rights. Congress concluded that water pollution seriously harmed the environment, and that although the cost of control would be heavy, the nation would benefit from controlling pollution. Yet scientific uncertainties made it difficult to assess the benefits to particular bodies of receiving water. . . .

More fundamentally, the new approach implemented changing views as to the relative rights of the public and of industrial polluters. Hitherto, the right of the polluter was pre-eminent, unless the damage caused by pollution could be proven. Henceforth, the right of the public to a clean environment would be pre-eminent, unless pollution treatment was impractical or unachievable.

Id., at 1042-1043.

In this rule, the record (including information contained in the New Gen database about planned new facilities) and the detailed questionnaire of existing facilities indicates that the vast majority of new facilities are planning to meet the requirements of the rule (particularly the dynamic flow requirements) independent of this new rule. EPA views this current practice as an indication of best technology available for minimizing adverse environmental impact. See response to comment 068.007.

In this rule, EPA believes that it is guided by section 306 of the CWA, but that because section 316(b) is in a different portion of the CWA, and because the variance authorizations in the CWA are under section 301 governing effluent limitations, section 301's limitation of variances to existing sources do not control EPA in implementing section 316(b). In other words, the statute is silent with respect to variances for standards established under section 316(b). In establishing a new facility variance under the rule, EPA intends not to provide a license to avoid the rule's technology-based requirements, but to recognize flexibility where EPA did not account for the types of costs a particular facility would face in the record for this rule. This is similar to the approach upheld in Weyerhaeuser v. Costle, 590 F.2d 1011, 1033-35 (D.C. Cir. 1978) as applicable to economic variances under section 301(c) of the CWA which upheld EPA's interpretation of such variances as not being related to effects of the discharge on the receiving water.

EPA disagrees that technology costs can increase significantly especially when that technology is being required; in fact, market force operate to create competition among vendors of pollution control technology and costs of technology in general go down over time. See preamble section VIII and accompanying support document entitled: Economic Analysis of the Final Regulations Addressing Cooling Water Intake Structures for New Facilities. See preamble section VIII and accompanying support document entitled: Economic Analysis of the Final Regulations Addressing Cooling Water Intake Structures for New Facilities.

Comment ID 316bNFR.027.021

Subject Matter Code	16.5
Request for Comment: Use of Innovative Technologies	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Other Approaches Being Considered by EPA

One alternative considered by EPA involves allowing variances from the national BTA requirements based on the use on innovative cooling water intake designs to minimize adverse impact. EPA should encourage innovation in intake location and technology to further the development of new and improved fish protection technologies.

EPA Response

See response to comment 316bNFR.071.019.

Comment ID 316bNFR.027.022

Subject Matter Code	18.2
Compliance Cost/Revenue Test	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Best Technology Available (BTA) for Minimizing Adverse Environmental Impact at New Facilities

How Is Cost Being Considered in Establishing BTA fir New Facilities?

EPA discusses several options for using as cost tests associated with the proposed rule. The option, compliance cost/revenue test, was chosen as the most appropriate based on agency experience using this test and the data needed to calculate the costs are generally available. EPA goes on to state that compliance costs for steam electric utilities at between 0.1 and 4.4 percent of revenue. EPA feels these numbers to be of minimal significance. From a business perspective, even if the numbers seem relatively small, if there is no comparison of costs to benefit gained there is no way to determine if it is money well spent. There needs to be some mechanism that considers the cost/benefit of regulations that incrementally increase construction and operational costs by many millions of dollars for a product that is essential for people's daily lives.

EPA Response

See Response to Comments 316b.NFR.068.337. 316b.NFR.068.007, and 316b.NFR.068.008.

The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. The technologies used as the basis for the final rule are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts. Similarly, the technologies used as the basis for this option also have acceptable non-aquatic environmental impacts. It is well established that in setting technology based new source performance standards, EPA is not required to demonstrate receiving water quality benefits. See e.g., Weyerhauser Co. v. Costle, 590 F.2d. 1011 (D.C. Cir. 1978). Nevertheless, EPA has considered the potential benefits associated with the implementation of these technology requirements; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures.

Comment ID 316bNFR.027.023

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Implementation

What Information Must I Submit to the Director When I Apply for My New or Reissued NPDES Permit

Source Water Baseline Biological Characterization Data

Conducting the Baseline Biological Characterization is reasonable to determine the condition of the aquatic system prior to construction of the cooling water intake. However EPA?s estimate of costs seems unrealistically low. It is unlikely that anyone would be able to collect one year worth of data that could adequately characterize a source water body for $32,000. The only way that could be completed is if another facility had recently completed a Baseline Study on the same body of water and the data from that study could be used. Based on our experience any data more than about five years old is considered unacceptable based on changes in water quality, species composition, or some other physical or political variable. EPA bases their estimate on the less comprehensive nature of the Baseline Study compared to historical 316(b) studies. Yet in the description of required data they describe a study to determine the presence of fish and shellfish (eggs, larvae, post larvae, juveniles, and adults) in the source water body and to document their presence during the course of a year in terms of the kinds, numbers, life stages, and duration of occurrence in the source water body in the vicinity of the intake structure. This describes a fairly detailed, comprehensive, and time consuming study of the aquatic biota over the course of a year. Sample collection alone is time consuming but analysis and identification of samples of aquatic insects and ichthyoplankton is extremely labor intensive. An estimate of $100,000 is probably more realistic and may still be low.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.027.024

Subject Matter Code 20.6

Monitoring Schedule

Author Name Edward M. Keith

Organization NRG Energy, Inc.

What Would I Be Required To Monitor

The monitoring regimen proposed by EPA requires at least two years of monitoring following permit issuance (at the discretion of the permitting authority permitting may be required every year) and monitoring the year prior to application for a new permit. EPA goes on to state that with each permit renewal, the applicant would continue to monitor individual aquatic organisms that are impinged or entrained. This would require each new permit holder to essentially monitor impingement and entrainment continuously for the life of the facility. It is unlikely that EPA or the State Agencies will have the time or manpower to review all of these reports annually. One year of monitoring prior to each permit renewal or one-year either side of permit renewal (to account for annual variation) would provide adequate documentation of the achievement of aquatic impact minimization or any changes to the aquatic community or the functionality of the intake system.

EPA Response

EPA is requiring that facilities monitor impingement monthly and entrainment biweekly for the first two years of the initial permit for each new facility. After that period of time, the permitting authority may require less frequent monitoring if they believe that they can collect representative data using the less frequent schedule. EPA believes that a minimum amount of data is necessary to effectively evaluate the operations of the facility and provide sufficient data to characterize impingement and entrainment at each facility.

Comment ID 316bNFR.027.025

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code EXIST

Existing Facility Rule

EPA states that this proposed regulation will apply to "new facilities" but in several instances there are indications that it will be extended in at least very similar format to existing facilities. Impact minimization at existing facilities will be much more challenging. Many existing facilities lack the necessary space to adapt most of the technologies (cooling towers, recirculation systems, or even new cooling water intakes) required by this proposal. When dealing with existing facilities the rules must provide them with the ability to enlist a combination of technologies in an attempt to reduce impacts with the understanding that minimization may not have the same meaning as it does for new facilities.

EPA Response

EPA will be addressing issues, including costs, regarding existing facilities, in the Phase II of this rulemaking.

Comment ID 316bNFR.027.026

Subject Matter Code MISC

Miscellaneous Comment

Author Name Edward M. Keith

Organization NRG Energy, Inc.

In submitting its comments to the proposed rules, NRG is compelled to note at the outset the difficulty associated with forming succinct responses to each of the many sub-proposals which are woven throughout the body of both the preamble and proposed rule. Many of these are not - and probably from a power plant location, design and operational standpoint should not be - mutually exclusive; many are confounded by past and proposed future rules and possible caveats to what may be the final rules; and many seem to be left open-ended despite ostensibly iron-clad national performance standards for location, intake velocity, intake flow thresholds and waterbody percentages, and presumed Best Technology Available (BTA) equivalents.

EPA Response

No response necessary. Commenter does not provide specific details or examples. EPA attempted to place as many options as possible on the table in order to foster the broadest debate possible about the appropriate regulatory approach for new facilities.

Comment ID 316bNFR.027.027

Subject Matter Code MISC

Miscellaneous Comment

Author Name Edward M. Keith

Organization NRG Energy, Inc.

We are also concerned that some of the information respecting previous guidance, power plant case histories, and ecological theory is either not representative of many generating station scenarios (plant-waterbody combinations) or has been taken out of context, thus leading to unfounded generalities.

EPA Response

It is important to note that information, concerning previous guidance, power plant case histories, and ecological theory were not used to make specific decisions about electric generating stations in the final rule, but rather to provide a perspective of the industry as it exists currently. Furthermore, examples on power plant case histories were not meant to predict effects at new facilities but rather to illustrate that the number of organisms impinged and entrained by a facility can be substantial. EPA also notes that these are examples of the types of impacts that may occur without controls, that these examples are not representative of all sites where facilities use cooling water intake structures, and that these examples may not reflect subsequent actions that may have been take into address these impacts on a site-specific basis.

Comment ID 316bNFR.027.028

Subject Matter Code	10.1
Request for Comment: Rebuttable Presumption Approach	

Author Name Edward M. Keith
Organization NRG Energy, Inc.

The only clear-cut instructions to the approach that the Director should take in evaluating an application for a new power plant is presented in section IX.B of the proposed rules, that being the following:

Step #1.

Is this a new facility?
Is there a cooling water intake structure (CWIS)?
Is the flow > 2 MGD?
Does the facility discharge pollutants?

Step #2.

What are the plant's locational features?

Step #3.

What are the design parameters (i.e. velocity and flow ratio)?

Step #4.

What additional technologies could be employed (based on the Source Water Baseline Biological Characterization)?

This model is fine, but in fact not conceptually different than the current (since 1977) site-specific, step-wise approach to evaluation of 316(b) Demonstrations. That approach began with consideration of whether the plant was a large one in an area of high biological value; a small one in an area of high biological value; a large one in an area of low biological value; or a small one in an area of low biological value. Obviously the last combination required the least extensive study and demonstration effort, and generally the least sophisticated intake technologies and circulating cooling water systems. And, other than a general rule of thumb that the intake approach velocity should be about 0.5 fps, there were no numeric performance standards (e.g. < 2 MGD; < 1% of the waterbody volume). Decisions concerning exact intake location, and system design, capacity and operation, were arrived at through the joint efforts and dialog between the utility company; the plant architect & engineering firm; the environmental consultant; and the lead regulatory agency (as influenced by comments from other agencies such as the U. S. Fish & Wildlife Service and the U.S. Army Corps of Engineers). We submit that other than some thresholds below which impact potential may quickly be judged insignificant [such as EPA's proposed 0.5 fps through-screen velocity, or its 2 MGD (3 cfs) capacity], the differences in ecological value and/or single-species population distribution, abundance and dynamics are often so disparate even within the same waterbody types that a case-by-case framework offers the only rational decision-making paradigm for determining whether impact potential

of higher design parameters may be significant. This may argue in favor of the "rebuttable presumption framework" introduced in EPA proposal section VIII.A.1.

EPA Response

See response to comment 316bNFR.009.004.

Comment ID 316bNFR.027.029

Subject Matter Code 11.0

Best Technology Available-Location

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Location (proposal section VIII.A.2)

NRG is in agreement that location is a key ingredient in determining not only the biological impact potential of a cooling water intake structure (CWIS), but whether the plant can be built and the CWIS will function properly in the first place. The latter factor sometimes rules out some of the least biologically productive areas on a waterbody, but frequently results in selection for those kinds of areas (e.g. a channelized shoreline vs. one through a recognizable littoral zone).

EPA Response

EPA agrees that location is an important factor in addressing cooling water intake structure impacts. However, after reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.027.030

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Likewise, while all steam electric generating stations must be built on the shore, most CWIS cannot be built in the littoral zone and still deliver a reliable source of year-round cooling water. Thus, deepening of the shore, creating embayments and canals, or moving the intake point of withdrawal offshore is necessary.

EPA Response

Under Today's final rule, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody.

Comment ID 316bNFR.027.031

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Finally, not all littoral zones (as defined by light penetration alone) are of equal habitat value; not all portions of an estuary or tidal river are of equal importance; and, in many estuaries and most tidal rivers, the total width precludes locating the CWIS 500 m offshore without coming within 500 m of the opposite shore.

EPA Response

See response to comment 316bNFR.027.015

Comment ID 316bNFR.027.032

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 10.01

Regulatory Framework Options

Apart from the problem of grouping all of the nation's waterbodies into four categories, irrespective of climate, hydrology, and other "ecoregional" differences (a problem increasingly being recognized by experts trying to reach consensus on nationwide "biocriteria" and biological assessment tools), NRG wishes to offer a few additional comments specific to these types of waterbodies.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type.

Comment ID 316bNFR.027.033

Subject Matter Code	11.13
Littoral Zone in Tidal Rivers/Estuaries	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Estuaries and Tidal Rivers

This is the category in which the EPA proposes to enforce the most stringent levels of protection, over-and-above CWIS flow volumes and velocities, throughout the whole waterbody. It is also the category which has the most heterogeneity, even within the same system. For example, some tidal rivers in the northeast are relatively small, being historically most important for spawning runs of species such as alewife, blueback herring and white perch. Many of those runs were precluded during the first half of the century by dams and other impediments. In some large tidal rivers, such as the Hudson River, the portion above the salt front (0.5 ppt) is important to striped bass and American shad spawning, whereas the brackish portions of the estuary are more important as nursery areas for these and other species (impingement rather than entrainment issues).

Within an estuary, some areas are typically urban (with bulkheaded shores and deepened channels), some are salt marshes (already protected by state and/or federal wetlands acts), some are mud flats, some are sandy bars, some are dredged and maintained navigation channels, and some are simply sinks for contaminated sediments. Not all of these areas have the same ecological value, and many of these waterbodies are not sufficiently large so as to place a CWIS 500 m offshore except at their mouths to the next larger waterbody. Even at those locations it may be impossible to extend the intake far offshore. Cases in point are some Connecticut estuaries tributary to Long Island Sound, which have protected private oyster grounds that cannot be infringed upon. Additionally, maintenance dredging of important navigation channels may preclude construction of deeper (~ 40`) offshore intake structures. And, finally, the late-stage larvae of one of the Northeast?s principal species of concern (the winter flounder) gravitates to deeper and saltier zones of the estuary as it adopts a benthic habit and transforms into the juvenile stage.

All of these factors argue for case-by-case, site-specific rules and procedures for deciding the location of a CWIS. None of them argue in favor of a 50-, 100-, 200-, 500 m, or any other numerically easy standard to adopt for CWIS distance offshore of the facility.

EPA Response

EPA agrees with the commenter that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. EPA believes that there were too many issues related to whether its definitions applied broadly across the whole country for purposes of making regulatory distinctions and that such an approach entailed administrative complexity of determining what type of water applied in every instance as compared to the two track approach EPA has adopted for new facilities. Therefore, after reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has

promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.027.034

Subject Matter Code	11.11
Littoral Zone in Rivers	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Rivers and Streams

The same kinds of arguments can be made relative to generating facilities located on freshwater rivers and streams. Channelization and natural changes in littoral zones resulting from waterbody sinuosity, not to mention occurrence of features like oxbows and man-made groins and structures which increase habitat diversity and productivity, make it impossible to generalize about distances outside the littoral zone at which impacts would be minimal. Most power plants have shoreline CWIS located on the outside bends or straight sections of rivers, or their construction has involved modification of a small portion of the shoreline so as to make it less littoral or attractive to nesting or foraging fishes. Again, EPA's premises concerning biological values of the littoral zone must be challenged relative to actual experience and the behavior of representative important species. Experience at most, if not all, of the riverine plants NRG is familiar with in the eastern half of the U.S. proves that it is not the nesting sport fishes (e.g. basses) which are impinged or entrained most, but the highly-fecund species which broadcast their eggs and provide no parental protection (like nest guarding) which are the most vulnerable but also most resilient from a population standpoint. No matter what the CWIS design or location, the dominant species entrained or impinged at these plants are the shads (gizzard and threadfin shad, river herring or skipjack herring, depending on ecoregion) and (in the midwest) also the freshwater drum.

NRG owns and operates a plant on the Connecticut River which has a shoreline intake; a CWIS flow of 172 MGD; a through-screen velocity profile averaging about 2 fps; screen approach velocities between 0.5 and 1.0 fps; and monthly and annual average CWIS:river flow ratios of 2-5%. Its annual impingement is less than 4,000 fish (mostly river herring). And, if NRG were to relocate its intake point of withdrawal 50 m outside the "littoral zone", or (alternatively) 30% of the distance across the river, there would be heightened concern about impingement of juvenile shortnosed sturgeon (which prefer channel habitats and are a threatened species). Still, as part of our NPDES renewal, we are in the process of negotiating another impingement study with the state regulatory agency to determine the efficacy of installing a fish return system to further minimize impact on individual fishes.

These facts also argue in favor of case-by-case decisions made at the state level by those biologists who know the area best.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most

stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.027.035

Subject Matter Code	11.12
Littoral Zone in Lakes/Reservoirs	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Lakes and Reservoirs

First, lakes and reservoirs encompass a wide variety of waterbodies ranging from the reservoirs constructed in the southwest for the sole purpose of providing condenser cooling water (and incidentally providing tremendous sport fishing opportunities in areas otherwise devoid of these resources); to the huge reservoirs of the Tennessee Valley Authority (TVA); to the Great Lakes. CWIS in reservoirs are generally located along the shoreline, adjacent to excavated areas of former littoral zones, whereas Great Lakes CWIS may be either onshore (typically through some sort of intake canal) or 500 m or so offshore at depths of 20-30 ft (mostly nuclear plants). In the latter case, the offshore intake location has been determined partly by icing and other NRC reliability and (therefore) safety issues. In all cases we are familiar with, irrespective of ecoregion or location on the waterbody, the dominant species entrained and impinged have been forage species such as alewife, threadfin and gizzard shad, smelt, and in some case shiners. In the case of the Great Lakes' alewife, that species is (1) a non-indigenous one which found access to the lakes when the Welland Canal let them get past Niagara Falls by the 1930s and quickly occupied a niche vacated by chubs (Coregonid species) which had been overfished, and (2) a species which for years has experienced huge natural summertime die-offs. Some of these die-offs, with fish fouling the beaches, have been at least equivalent to the 1-3% mortality rates at the Ludington pump-storage facility cited by EPA in section X.B as being responsible for a 3-14% shortfall in potential production of trout and salmon in Lake Michigan. We suspect that the production figures were based on consumption rates of the salmonids (how many salmonids could subsist on the number of alewives impacted by Ludington), and not that these top predators are known to be limited by supply of alewives in the lake. With reference to salmonids, it is also well-known that these species tend to seek-out the thermocline of certain lakes and reservoirs during summers, a factor which should be taken into account when arguing for across the board sublittoral CWIS locations.

Again, site-specific factors must be considered when locating a CWIS, and it is not necessarily true that intakes in the littoral zone impact more, or higher economic value species, than intakes located further offshore. The species distribution and abundance (all life stages), basin morphometry. and hydrology of the lacustrine system need be taken into account to minimize overall impact on species or communities.

EPA Response

EPA does not agree that the susceptible life history stages of lake forage species (such as those listed by the commenter) are as likely to be impinged or entrained at an offshore intake as an intake located inshore. Basic life history information for many forage species documents that spawning events and juvenile stages often occur in nearshore lake waters. As an example, young-of-the-year gizzard shad form schools and are usually found close inshore within shallow waters overlying mud bottom (Dames & Moore, 1977). Similarly, although adult alewifes typically inhabit deep, pelagic waters of landlocked

lakes, they migrate to harbors and nearshore waters to spawn in spring and early summer. However, EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.027.036

Subject Matter Code 11.14

Littoral Zone in Oceans

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Oceans

All facilities we are familiar with incorporate offshore CWIS locations. While it is not true that abundance of fish is less (say) 500 m offshore than in the littoral zone, it is true that an intake is more reliable located below mean low water, and outside the surf zone.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.027.037

Subject Matter Code	13.1
	Requirement of 0.5 fps

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Design

We have limited our comments to EPA?s proposals concerning intake velocity and flow, because the bells and whistles are clearly a function of plant size and site-specific waterbody features and fish species.

Velocity (proposal section VIII.A.4)

Most steam electric generating stations built and/or designed in the late 1970s had a design (performance) standard of 0.5 fps just upstream of the screens (i.e. screen approach velocity). This was the rule of thumb based on regulatory agency guidance. EPA (1973) recommended reducing intake velocities to below 0.5 fps at the trash racks to enable fish to escape the screenwell, while NRC (1975; as cited by Boreman, 1977) stated "Acceptable approach and screen face velocities are based on fish swim speeds which will thus vary with the species, site and season. Maximum acceptable approach velocities are on the order of 0.5 fps".

Many older plants, which originally had higher velocities (when all units were operable), now have screen approach velocities in the neighborhood of 0.5 fps due to the withdrawal of smaller volumes of cooling water. Though many new plants may be built, from scratch, to incorporate a 0.5 fps through-screen velocity, our concern is that establishment of that as the performance standard which is most protective of aquatic life for new plants may inevitably influence proposed standards for existing plants. Based on available information (including comments by EPA during its 1998 hearings and meetings with the Electric Power Research Institute), NRG, like many utilities, considered a 0.5 fps approach velocity to be the likely future performance standard when undertaking its risk-based due-diligence process for potential acquisitions. The first suggestion that EPA may be considering through-screen velocities as a standard came via the industry questionnaires distributed earlier this year.

Mentioned above was the fact that one of NRG?s riverine plants has approach velocities approaching 1 fps, yet impinges fewer than 4,000 fish (mostly river herrings). Another (117 MGD) plant, located on a tidal river, has a similar approach velocity yet impinges less than 3,000 fish/year. A third plant, an estuarine station withdrawing 211 MGD with similar screen approach velocities, has an annual impingement rate of 23,000. And, a fourth plant, an 82 MGD plant on a tidal river, impinges fewer than 9,000 fish/year even though the through-screen velocity is 1.15 fps at low water level.

The point here is that while a 0.5 fps through-screen velocity should, all other things being equal, result in negligible impingement, the converse is not always true (i.e. CWIS with higher through-screen velocities may also impinge very few organisms, depending on site-specific factors).

EPA Response

Today's rule applies only to those facilities which are new facilities by the terms of this regulation. This regulation does not apply to existing facilities including major modifications to existing facilities that would be “new sources” under effluent limitations guidelines and pretreatment standard regulations unless the facility also meets the conditions for new sources under today's regulation. EPA will address existing facilities fully in Phase II and Phase III rulemakings. Also see 316bNFR.030.003, 316bNFR.532.001 and 316bNFR.532.002.

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

Comment ID 316bNFR.027.038

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 7.4

Water Withdrawal threshold

Flow and Volume (proposal sections VIII.A.1&3)

EPA's discussion of the myriad factors and proposals associated with this subject was very difficult to critique. The threshold capacity of 2 MGD seems unnecessarily low, much as the New York State Department of Environmental Conservation's (NYSDEC) estimate of impingement at the 4 MGD Athen's station on the Hudson River (section V.D) seems too high given the experience we have had at our plants. Nonetheless, we have no real basis to argue for or against any other possible threshold.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.027.039

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 12.1

Freshwater Streams/Rivers

Nor, though we advocate case-by-case determinations of the impact of CWIS:river flow percentages, do we take great exception to those proposed for freshwater rivers and streams (5% mean annual flow or 25% of the 7Q10). [We would not want the threshold to be set lower than 5%, however.]

EPA Response

EPA has opted not to include the 25% 7Q10 standard in today's final rule.

Commenter supports the 5% mean annual flow requirement.

Comment ID 316bNFR.027.040

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 12.21

Thermal Stratification

Likewise, though we feel that the non-disruption of thermal stratification in lakes and reservoirs (as a criterion) is of limited value (since we are aware of no such recorded cases for CWIS, albeit thermal discharges have sometimes caused "sinking plumes"), do we have reason to take exception to that proposal.

EPA Response

Commenter does not object to EPA's final framework for lakes and reservoirs.

Comment ID 316bNFR.027.041

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Closed Cycle Systems

As early as 1977, Boreman (then with the USFWS "Steam Team" in Ann Arbor, MI; now with NMFS in Woods Hole, MA) stated: "It is important to keep in mind that closed cycle cooling is not the best available technology in all cases. Minor alterations in existing open cycle systems to minimize impact should be recommended whenever possible. Each system must be judged on a case-by-case basis". For low MWe, new generating stations in some locations, this may (financially) be a viable option. However, noting again NRG's experience at plants cited above (which use once-through cooling), even moderately large capacity generating stations may experience low impingement rates (which may be a partial function of flow, in addition to velocity and other design parameters), and even rates of entrainment which, on a species-specific basis, may not be significant at the population level. If they had been significant at most plants over the past three or four decades, we would be seeing many more depleted stocks of fish around the country than can be explained by loss of physical habitat, and/or commercial and sport fishing harvest.

EPA Response

Please see response to comment 316bNFR.014.013 and the preamble to the final rule.

Comment ID 316bNFR.027.042

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Further on the issue of impact, though not actually part of the CWIS as confirmed in statements at EPA's June, 1998 hearing, wet cooling towers can have other types of impact which can be very serious in some parts of the country. These include, but are not limited to, fog and ice by highways, and consumptive water losses in more arid locales.

EPA Response

See response to comment 316bNFR.014.019 and 316bNFR.068.100.

Comment ID 316bNFR.027.043

Subject Matter Code 10.04

Site-specific Permit Flexibility

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Again, NRG implores EPA to consider closed cycle cooling to be a site-specific issue, handled on a case-by-case basis during which process all of the many options for minimizing entrainment and/or impingement to acceptable levels ... where benefits of the chosen technologies would exceed costs ... can be properly evaluated and compared.

EPA Response

Under the final rule, EPA has adopted a two-track approach. The two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the “fast track” (Track I), or by demonstrating the same level of performance as the Track I requirements under the “demonstration track” (Track II). EPA's technology-based response is discussed in the preamble to the final rule and elsewhere in this response to comments document.

Under Track I, the capacity of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system and the design through-screen intake velocity is restricted to 0.5 ft/s. The rule also includes requirements that restrict the total quantity of intake in proportion to the mean annual flow of a freshwater river or stream, or the natural thermal stratification or turnover patterns of a lake or reservoir, or to a percentage of the tidal excursions of a tidal river or estuary. In addition, the applicant must select and implement an appropriate design and construction technology for minimizing entrainment and impingement and maximizing impingement survival.

Under Track II, the applicant has the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements for capacity, design velocity, and design and construction when applied to a shoreline intake at the new facility site. Proportional flow requirements also apply under Track II.

EPA also notes that certain facilities following Track II may be able to demonstrate reduction of impingement and entrainment to the same level as would be achieved under Track I using lower-cost alternative technologies.

Comment ID 316bNFR.027.044

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Consistency with Other EPA Programs

NRG is not convinced that the proposed rules are consistent with other programs, and that the final rule will address subjects such as site-specific waterbody use classifications (e.g. fish survival vs. fish propagation); permit variance mechanisms; and population impact thresholds. With respect to statements in sections VII.D and VIII.A.3 of EPA's proposal, when speaking about the 1% level of impact being consistent with other programs, please consider the following quotes taken from EPA's (1999) draft water quality criteria for dissolved oxygen in saltwater:

p.11. Larval recruitment effects - "The maximum acceptable reduction in seasonal recruitment was set at 5%, which is equivalent to the protective limit for juvenile and adult survival".

p.47-48. (under Biological effects -) "The acceptable impairment can be a risk-management decision. The 5% impairment level was selected to be consistent with the protection provided to juvenile and adult life stages".

NRG suggests that further research and documentation about this subject is warranted.

EPA Response

At proposal, EPA considered several approaches for defining AEI including defining AEI as "the impingement or entrainment of one (1) percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." EPA rejected this definition for the purposes of today's rule for new facilities.

EPA believes that the interpretation of AEI for today's rule is consistent with EPA and other federal programs. Under today's technology-based rule, AEI includes impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population’s potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.).

Comment ID 316bNFR.027.045

Subject Matter Code	12.31
Request for Comment: Proportional Flow Requirement	

Author Name Edward M. Keith
Organization NRG Energy, Inc.

Estuary and Tidal River Flow Ratios:

First, as discussed in section 2.1.1 of our comments, not all portions of these systems are biologically equivalent. As such, the distribution and abundance of organisms in the near-field, far-field, and above and below the CWIS needs to be factored into the evaluation for impact potential (i.e. weighted). This may work in favor of some locations, and against others, but it would be more appropriate than simply taking 1% of the volume enclosed by an arc around the CWIS with radius equal to 1/2 the tidal excursion distance at mean low water. Second, we can envision (but have not had time to compute) situations where, based on the size and configuration of the waterbody relative to the location of the CWIS, the proposed method of calculating the tidal excursion distance and volume would be difficult. Perhaps EPA can present some examples of this calculation for a number of estuaries and tidal rivers around the country. Finally, NRG urges EPA not to adopt its standards for these waterbody types to any or all of the other three waterbody categories, especially given what EPA has already said about those waterbody types; the consistency in impact levels with other programs; and the site- and species-specific nature of any real impacts.

EPA Response

EPA agrees that all locations of a particular waterbody are not necessarily equally productive, but does not support a community- or population-based method of assessing adverse environmental impacts. Instead, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody (i.e., littoral zone). Today's final rule adopts the two-track approach and does not set different requirements for best technology available for minimizing adverse environmental impact for different parts of estuaries and tidal rivers. For further discussion on a population-based definition of AEI, please see response to comments under subject code 9.47 of this document.

While EPA presented three methods for calculating the tidal excursion, most new facilities sited on an estuary or tidal river will likely opt for the simplest method discussed at 65 FR 49098. Calculation of the tidal excursion using this method requires no specialized training and nautical information and tide charts are readily available for all areas of the US. EPA recently used this method to calculate the tidal excursion for existing facilities that submitted information under EPA's survey questionnaire and was able to complete the exercise for 97 of the 103 facilities. The remaining six could not be completed for reasons unrelated to the method of calculation.

Comment ID 316bNFR.027.046

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Restoration (proposal section VIII.A.6)

There have been no greater impacts to fisheries than loss, or loss of access to, habitat. Even with wetlands acts in place for over twenty years, population growth, sprawl and development continue to nip away at these areas. Salt marshes surrounding the Delaware Estuary have for almost a century been lost by dredge-and-fill operations; solid waste disposal; agriculture (including salt hay farming); mosquito control drainage; transportation corridors; and even natural processes. Public Service Electric & Gas Company of New Jersey has made great strides in restoring such habitats, in addition to building fish passage facilities for river herrings whose spawning runs had been impeded since the early 1900s. Within freshwater systems (rivers and lakes), other types of traditional fish habitat improvement techniques can be considered.

NRG submits that these kinds of restorative measures should be on the menu of impact-reducing options available to a plant operator, along with all of the other kinds of screening and behavioral techniques and operational alternatives (proposal section VIII.A.5). These should be neither mandatory nor excluded from consideration.

EPA Response

See response to comment 316bNFR.024.007

Comment ID 316bNFR.027.047

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Adverse Environmental Impact (proposal section VII.D.)

EPA has not defined Adverse Environmental Impact (AEI) in its proposal, but notes that they conceptualize AEI as the recurring and non-trivial impingement and entrainment of organisms (i.e. not just an individual organism). That makes sense. Then EPA describes five possible approaches to defining impact: (1) some percentage (e.g. 1%) of the near-field source volume; (2) retaining the case-by-case, site-specific 1977 archetype for assessing impacts; (3) "any" impingement or entrainment; (4) relative to reference sites; and (5) somehow related to threatened or endangered species, other types of important species (e.g. recreational or commercial), and community integrity. We have already argued against option #1, and for adoption of option #2.

With respect to option #3, please note that while NYSDEC opens their 1998 position paper with the definition EPA has cited, they go on to explain how they evaluate different ways of minimizing impact, including application of a "wholly disproportionate"cost test. The state-of-the-art of bioassessments is not so far advanced as to adopt option #4 at most power plant locations, most biocriteria and bioassessment techniques applying to wadable streams and decisions concerning impairment status relative to use classifications, with reference stations being a very thorny issue in urban watersheds. However, in siting power plants, the fish and benthic community distribution and abundance, and measures of diversity, have long been employed to evaluate site-specific alternative CWIS locations.

Ingredients of option #5 have, in part by law, always been integral to CWIS evaluations. The Endangered Species Act of 1973 ensured consideration of these species and their "critical habitat" for almost thirty years, and the Sustainable Fisheries Act of 1996 requires consideration of "essential fish habitat" for economically important species. These acts, along with wetlands acts and other state legislation such as New Jersey?s Coastal Area Facilities Review Act of 1973, also reinforce the suitability of case-by-case determinations of BTA.

EPA Response

Please see responses to comments 316bNFR.029.013, 316bNFR.014.013, and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.027.048

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

"Source Water Baseline Biological Characterization" Costs (proposal IX.A.1)

It is difficult to perform even a "paper study" for $32K. Consider the following analysis for even a minimal field study aimed at documenting the kind of detail laid out in EPA?s proposed baseline characterization:

$32,000- total estimated cost of characterization
- 5,000- out-of-pocket expenses, incl. equipment rental, T&L, phone, repro, etc.
$27,000
/ $50/hr- average consulting rate over all professional levels involved
540 hrs
- 80 hrs- planning and mobilization
460 hrs
- 40 hrs- project management (minimal)
420 hrs
- 80 hrs- draft and final reports (minimal)
340 hrs
- 96 hrs- data management and reduction, plus QC (minimal, 1 day/mo.)
244 hrs
- 240 hrs- maximum possible field work (2 people, 1 day/month, 10-hr days)
4 hrs- remaining for lab identifications (fish and shellfish eggs, larvae, postlarvae... [plus] "over duration of
occurrence @ intake area")
/ 4 hrs/sample - average lab time for a moderately dense plankton sample
= 1 sample - maximum number of plankton samples that can be taken and analyzed/yr.

The simplest study, with the barest scope of work, costs in excess of $50K, an average entrainment and impingement study costing about $100-150K/year.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.027.049

Subject Matter Code 20.2

Monitoring Requirements

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Monitoring (proposal sections IX.C and XI.A)

First, we assume that when EPA states that after two years the owner can request "less frequent" biological monitoring, that could include a complete discontinuance of monitoring. That should be stated. Second, NRG believes that the costs of monitoring, like the cost of the baseline study, have been underestimated, especially if seasonal and daily variation are to be addressed. NRG would like to see the basis of EPA's annual monitoring effort estimate of 1,524 hrs/year laid out.

EPA Response

In response to the comment addressing the request for “less frequent” biological monitoring, the assumption that this could include a complete discontinuance of monitoring is inaccurate. After two years, the Director may approve an applicant’s request for less frequent biological monitoring if the facility provides data to support the request showing that less frequent monitoring would still allow for the detection of any seasonal and daily variations in the species and numbers of individuals that are impinged or entrained. The Director should approve a request for reduced frequency in biological monitoring only if the supporting data show that the technologies are consistently performing as projected under all operating and environmental conditions and less frequent monitoring would still allow for the detection of any future performance fluctuations.

In response to the comment addressing the costs of monitoring, EPA has revisited and revised the cost estimates for monitoring based on revisions in the final rule, and these costs are documented for the record in the ICR.

Comment ID 316bNFR.027.050

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

Author Name Edward M. Keith
Organization NRG Energy, Inc.

Cost Tests (proposal section VIII.C)

NRG is in agreement that the wholly disproportionate test should be re-adopted for existing plants. However, EPA's determination that compliance cost:revenue cost, or compliance cost:construction cost tests demonstrate that the cost of complying with today's proposed BTA is a small price to be paid by utilities is not well supported. First, it is unclear from the numerous options proposed exactly what EPA has used as the BTA standard for the cost test. Second, from the costs of study and monitoring presented in the proposal, it is likely that some of the compliance costs have been underestimated. These conclusions should be revisited with more detail and definition.

EPA Response

EPA disagrees with the comment that the cost tests used in the analysis of BTA requirements are not well supported. For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. EPA determined economic practicability by considering the cost of the rule as compared with the revenue of a facility, as well as the cost compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA which use very similar language to section 316(b) and to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA.

See also response to comment 316bNFR.008.013 above.

With regard to the commenter's confusion regarding specific BTA requirements, EPA has revised these requirements for the final rule. Finally, EPA has revised its unit cost estimates (see the Technical Development Document).

Comment ID 316bNFR.027.051

Subject Matter Code	23.3
State Burden and Costs for Permitting Activities	

Author Name Edward M. Keith

Organization NRG Energy, Inc.

State Roles (proposal section IX.F)

NRG's only comment about this section is to say that, short of proposing a case-by-case approach to implementation of section 316(b), we suspect that promulgation of most of EPA's proposed rules would substantially increase the burden on states or other regulatory entities

EPA Response

EPA does not anticipate that the final rule will substantially increase the burden on permitting authorities; if anything, it will have the opposite effect. In the past, as described in Section II.C.4 of the preamble to the final rule, permitting authorities have made decisions implementing section 316(b) on a case-by-case, site-specific basis. Under this approach, determining whether appropriate studies have been performed and whether a given facility has minimized adverse environmental impact has been very burdensome on the permitting authorities. In addition, these determinations have often been subject to challenges that can take a long time to resolve, resulting in even more burden on the permitting authorities. Track I of the final rule streamlines the permitting process by specifying the technology performance requirements and minimizing study requirements, thus resulting in significantly reduced burden on the permitting authorities. While Track II of the final rule requires more detailed studies to be performed, it provides a clear set of impingement and entrainment reduction standards that must be met, and specifies the types of studies that must be performed and the information that must be contained in these studies. Thus, Track II reduces the permitting authority's need to expend resources in determining whether appropriate studies have been performed, allowing the permitting authority to more efficiently focus its resources on determining whether adverse environmental impact has been minimized.

Comment ID 316bNFR.027.064

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Edward M. Keith

Organization NRG Energy, Inc.

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Roger Claff

On Behalf Of:

American Petroleum Institute

Author ID Number:

316bNFR.028

Note

Fully supports the comments made by OOCI (316bNFR.022) and IADC (316bNFR.004)

Comment ID 316bNFR.028.001

Subject Matter Code MISC

Miscellaneous Comment

Author Name Roger Claff

Organization American Petroleum Institute

API has reviewed the proposed regulations for cooling water intake structures at new facilities. In the course of our review we have also met with other industry associations, including the American Forest & Paper Association, Edison Electric Institute (EEI), Utility Water Action Group (UWAG), American Chemistry Council, Small Business Administration, American Iron and Steel Institute, and American Textile Manufacturers Institute, to help us fully understand the impact of the proposed rule on industry in general and on our member companies in specific. Our review has led us to conclude that the proposed rule contains serious conceptual and technical flaws which would result in substantial and unnecessary costs being incurred by our members and many other industries.

EPA Response

No response necessary. The commenter states that the proposed rule contains serious conceptual and technical flaws which would result in substantial and unnecessary costs, but does not provide specific examples or details of their concern. Specific comments are responded to elsewhere in this document. EPA does not consider that the cost of the final rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable.

Comment ID 316bNFR.028.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Roger Claff

Organization American Petroleum Institute

Furthermore, EPA has completely ignored the unique operations of the offshore oil and gas exploration and production segment of the petroleum industry. The proposed regulation does not consider the specialized cooling water requirements of offshore drilling platforms and the adverse effects that this rule would have on offshore petroleum exploration and production operations. The Offshore Operators Committee (OOC) and the International Association of Drilling Contractors (IADC) are submitting comments on these specific issues. API fully supports the comments of those two organizations and incorporates their comments by reference.

EPA Response

See response to comment 316bNFR.022.001.

Comment ID 316bNFR.028.003

Subject Matter Code EXIST

Existing Facility Rule

Author Name Roger Claff

Organization American Petroleum Institute

Although the proposed regulations only address new facilities, API is concerned that EPA will consider many of the underlying principles of the regulation to be applicable to existing facilities. We appreciate that the Agency has clearly stated that requirements for existing facilities must be different from those for new facilities, as retrofitting may be cost prohibitive or even impossible. Nevertheless, we are concerned about the implications of this rule for the scope of the upcoming proposed rule for existing facilities, given that many of the underlying assumptions and requirements of the proposed rule are either flawed or inappropriate for any facility - new or existing.

EPA Response

EPA reiterates that the final rule promulgated today applies to new facilities. The Agency is not making any decisions in this rule for existing facilities and believes it has discretion under section 316(b) to make different decisions for existing facilities based on distinctions between existing and new facilities.

Comment ID 316bNFR.028.004

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Roger Claff

Organization American Petroleum Institute

EPA has not defined adverse environmental impact, which is the explicit requirement that must be achieved by best technology available, as defined in Section 316(b) of the Clean Water Act (CWA). In the absence of a definition of adverse environmental impact, it is impossible to determine the best technology available, its cost, and its effectiveness. For this reason, if no other, the proposed rule is deficient and cannot be promulgated in its current form.

EPA Response

Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.028.005

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Roger Claff

Organization American Petroleum Institute

Adverse environmental impact must be defined based on effects on aquatic communities, not effects on individual organisms.

EPA Response

Please see response to comment 316bNFR.802.013.

Comment ID 316bNFR.028.006

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Roger Claff

Organization American Petroleum Institute

An appropriate de minimis cooling water intake flow threshold for rule applicability must be defined. The proposed threshold of 2 million gallons per day (MGD) is completely unsupported by any of the entrainment and impingement studies cited by EPA in the proposed regulation. The studies are all on large facilities in the steam electric power generation industry and cannot be used to justify the 2 MGD threshold. A much higher de minimis threshold than 2 MGD will still assure that the majority of new facilities with cooling water intakes will be captured by the regulation. API recommends an intake flow threshold of 30 MGD, which would cover 99 percent of the existing cooling water use according to EPA's own estimates. By establishing such a reasonable and protective de minimis threshold, EPA will encourage new facilities to design cooling water systems that will be below the de minimis intake water level.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather,

there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.028.007

Subject Matter Code 19.3

Source Water Physical Data

Author Name Roger Claff

Organization American Petroleum Institute

The littoral zone as defined by EPA is unlikely to be clearly delineated for permit writers. Data supporting this delineation will not be available for many water bodies, and in some cases, available data on the extent of the littoral zone may be contradictory. Hence, interpretation of the proposed littoral zone definition will be a difficult challenge for the permit writer, and is likely to lead to incorrect assumptions about the applicability of intake structure requirements.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.028.008

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

API supports EPA's determination that zero intake of cooling water is not a technically feasible alternative for many locations and types of cooling water use. We note that EPA's evaluation of zero cooling water use focused on steam electric power plants. If the Agency had looked at the heat dissipation needs of manufacturing industries, they would find that zero cooling water intake would be even more difficult to justify.

EPA Response

See response to comment 316bNFR.003.002.

Comment ID 316bNFR.028.009

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 9.4

Adverse Environmental Impact

SCOPE AND APPLICABILITY (40 CFR 125.80, 125.81 and 125.83)

EPA must define "adverse environmental impact" before it adopts this rule, because the acceptability of all of the rule applicability criteria and the best technology available requirements must be evaluated in terms of their ability and necessity to "minimize" such impacts.

Section 316(b) of the Clean Water Act requires the "location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact;" however, EPA has not defined "adverse environmental impact" in this proposed rule. Rather than developing any guidance or criteria for determining adverse environmental impact, the proposed rule simply defines applicability criteria, location standards, and design standards in the abstract using very conservative assumptions assumed to minimize adverse impacts. The rule is structured to attempt to protect individuals of species, rather than aquatic biota populations and aquatic communities. The focus of this rule must be shifted from the infeasible objective of attempting to account for each and every individual organism to the achievable objective of protecting resident biological populations of surface water bodies from adverse impacts.

Before it proceeds any further with the proposed regulations, EPA must develop a scientifically based, defensible definition of adverse environmental impact. This definition must focus on aquatic biota populations and communities, not on individual organisms. This focus has been the historic approach that EPA and states have used to evaluate cooling water intake structures, and it must be continued to support development of this rule. It is not possible to make an intelligent decision on the required levels of control pursuant to Section 316(b) in the absence of an appropriate definition of adverse environmental impact. Furthermore, it will be difficult if not impossible to evaluate and compare best-technology-available options in the absence of a clear definition of adverse environmental impact.

The definition does not have to be quantitative. It may also be appropriate for EPA to develop a separate guidance document that describes how adverse environmental impacts should be determined on a site-specific basis. A basic definition is essential, however, in order to judge the efficacy and value of each of the many alternatives that EPA has discussed in the preamble to the proposed rule. In the absence of such a definition, it is impossible to evaluate the benefits of the alternatives that EPA has presented in the rule.

EPA Response

Please see response to comment 316bNFR.507.004, 316bNFR.014.019, section VI.B.2 of the preamble, and elsewhere in this comment response document for further discussion of why EPA is not measuring reduction of AEI at the population or ecosystem level for new facilities.

Comment ID 316bNFR.028.010

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Roger Claff

Organization American Petroleum Institute

API objects to the definition of a cooling water intake as any intake that withdraws surface water and uses at least 25% of the water for cooling.

Currently, EPA defines a cooling water intake as a surface water withdrawal where at least 50% of the water is used for cooling (65 FR 49067). The Agency's rationale for lowering the threshold for defining a cooling water intake to 25% cooling water is that it wants to "ensure that almost all cooling water withdrawn from waters of the U.S." are regulated. Yet there is no technical basis provided in the rulemaking record to indicate that this is necessary for predominantly process or non-cooling water intakes to minimize adverse environmental impact as required by Section 316(b) of the Clean Water Act.

The Agency has a scientific and legal obligation to provide a data analysis demonstrating the need to extend this regulation to facilities whose intake water usage is primarily for purposes other than cooling.

EPA Response

EPA believes that intake structures have the potential to cause the same types and degree of impacts regardless of the purposes, in addition to cooling, for which the water will subsequently be used. EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.028.011

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Roger Claff

Organization American Petroleum Institute

The proposed threshold intake water flow of two million gallons per day for applicability of this regulation is not justified by any technical or scientific analysis that demonstrates adverse environmental impacts at such a low flow.

EPA is proposing that the technology requirements of the proposed rule would apply to all new cooling water intake structures with design flows of 2 million gallons per day (MGD) or greater (40 CFR 125.81). EPA has requested comment on this design flow and alternate flow thresholds up to 30 MGD (65 FR 49067).

In the preamble of the proposed rule, EPA concedes that there is very little information on entrainment and impingement impacts for intake water flows less than 100 MGD (65 FR 49068). In the preamble, all of EPA's examples of cooling water intakes causing documented impacts on aquatic populations are for facilities with intake flows of greater than 100 MGD (65 FR 49073). Two entrainment/impingement studies at lower flows are cited, one at 20 MGD in Michigan and another at 4.2 MGD in New York. There is no indication, however, that either of these studies documented that the intakes would have any significant adverse environmental impacts on the aquatic populations in the surface waters from which the water is withdrawn.

API reviewed the 1998 and 1996 EPA National Water Quality Inventory reports (EPA841S-00-001 and EPA841-R97-008, respectively) to determine if any states had specifically identified entrainment and impingement as sources or stressors leading to impaired aquatic life uses. None of the states, nor EPA, identified entrainment and impingement of aquatic life by cooling water intakes as a source or cause of impairment in rivers/streams, lakes, estuaries, or oceans. The absence of such designations supports the conclusion that significant adverse environmental impacts due to cooling water intakes are rare and highly site-specific.

The specific language of Section 316(b) requires EPA to develop technologies for cooling water intakes to minimize adverse environmental impacts. In the absence of any data or analysis which demonstrates that cooling water intakes with design flows less than 100 MGD cause adverse impacts, EPA should not lower the applicability threshold to 2% of the demonstrated level of potential impacts.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and

there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

Finally, with regard to the 305(b) reports, under current requirements there is neither sufficient data nor standards to identify cooling water intake structures as distinct causes of water quality impairment. Intakes pose different issues than the discharge of pollutants. In the 305(b) reports, impairment is typically identified by comparing ambient water quality data with water quality standards. There are no water quality standards that address intake issues such as impairment and entrainment.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.028.012

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Roger Claff

Organization American Petroleum Institute

The threshold design intake cooling water flow for applicability of proposed best technology available should be no lower than 30 MGD.

EPA has documented in the preamble to the proposed regulation that a threshold of 25 MGD would regulate 99% of the cooling water used by the regulated industries (65 FR 49068). This represents industry coverage that is more comprehensive than any of the Agency's effluent limitations guidelines and standards rule. This exceptionally high level of coverage, coupled with the fact that, per our comment above, adverse environmental impacts are not observed at even higher flows, supports EPA adoption of a 30 MGD threshold, the maximum flow threshold being considered.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow (estimated total flow is approximately 9 billion gallons per day) and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.028.013

Subject Matter Code 7.1

Definition: New Facility

Author Name Roger Claff

Organization American Petroleum Institute

API supports EPA's proposed definition of a new cooling water intake structure for the purposes of determining the applicability of the proposed rule.

The proposed definition links the cooling water intake structure to the NPDES definition of a new facility or new discharge (40 CFR Sections 122.2 and 122.29(b)(1)(2), and (4)). Thus, reconstruction or replacement of an intake structure at an existing source would not be subject to the proposed rule. The preamble makes clear that this is the intent of the rule (65 FR 49066).

Linking the definition of a new cooling water intake structure to that of a new facility is appropriate given that the proposed rule for cooling water intake structures has provisions that are inextricably linked to the manufacturing facility itself, i.e., minimizing cooling water use. EPA should adopt this definition of a new cooling water intake source as proposed.

EPA Response

Comment supports proposed definition of new cooling water intake structure. No response necessary.

Comment ID 316bNFR.028.014

Subject Matter Code MISC

Miscellaneous Comment

Author Name Roger Claff

Organization American Petroleum Institute

EPA's definition of a new source in the proposed cooling water intake rule would make existing mobile drilling platforms subject to this regulation.

EPA has identified oil and gas extraction operations as potentially subject to the proposed regulation (65 FR 49061). Mobile drilling rigs used for oil and gas exploration and production are existing equipment moved to new sites in open ocean waters. Offshore production platforms are permanent structures that are constructed at a site to produce oil and gas from multiple wells. Offshore platforms and mobile drilling units could be considered new sources when drilling new development wells, based on the definitions provided in the Effluent Limitation Guidelines for the Offshore Subcategory (40 CFR 435). The preamble to these effluent limitations guidelines states at 58 FR 12456: "Thus, development and production facilities at a new site would be new sources under the Offshore Guidelines."

Mobile drilling rigs typically have cooling water requirements that are greater than the 2 MGD threshold proposed for applicability of the intake water rule. Thus, the 200 plus mobile drilling rigs currently in operation in U.S. surface waters could all be subject to the proposed rule for new sources. Offshore production platforms also use cooling water and their operations often require more than 2 MGD of cooling water use.

There is no evidence in the rulemaking record that EPA has considered any of the unique aspects of offshore drilling rigs in its evaluation of adverse environmental impacts, feasibility of technologies, or the economics of achieving the proposed regulatory requirements. Mobile drilling platforms are existing equipment moved to new exploration or production sites, and are not capable of being cost-effectively retrofitted with any of the best technology available alternatives that EPA has considered for this regulation. In fact, minimum intake velocities of 2-5 feet/second have been found to be necessary to prevent fouling of the cooling systems by growth of marine organisms.

In addition to the technical complications and the costs that would be incurred if the proposed rule is applied to offshore oil and gas production equipment, many of the underlying assumptions EPA has used to justify the proposed rule are not applicable to offshore operations. These rigs are in open ocean waters and are not in areas that serve as significant nurseries for marine aquatic species. EPA's assumption that such ocean waters are in the littoral zone is unsupported by any data or analysis. There are no data in the record for this rule that address impingement and entrainment by cooling water systems used on mobile drilling platforms and offshore production platforms and no documentation that these facilities cause adverse environmental impacts as identified in Section 316(b) of the Clean Water Act.

EPA has not evaluated any of these unique aspects of offshore exploration and production facilities in the development of this rule. API suggests that EPA specifically exempt such facilities from the application of this rule. Alternatively, EPA can increase the intake water threshold to 30 MGD, effectively exempting mobile drilling rigs and offshore production platforms from the regulation. In any case, EPA must justify its decision with a thorough analysis of the unique characteristics of

offshore drilling, technological feasibility, economic and adverse environmental impact.

EPA Response

Please see responses to comments 316bNFR.022.002 (offshore and coastal oil and gas facilities to be addressed in Phase III 316(b) rule), 316bNFR.022.005 (retro-fits of existing facilities), 316bNFR.022.007 (current lack of demonstrated relationship between intake velocity and marine growth), and 316bNFR.028.025 (littoral zone definition).

EPA will examine all issues related to location of offshore and coastal oil and gas facilities and marine aquatic nurseries. EPA will also examine a wide variety of potential regulatory options for controlling offshore and coastal oil and gas CWIS including establishing an alternative regulatory minimum intake thresholds for this industry.

Comment ID 316bNFR.028.015

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 7.52

Request for Comment: Indirect Dischargers

EPA has correctly exempted from this rule facilities that discharge cooling water to publicly owned treatment works (POTW).

The applicability of this rule is to new facilities that have, or will have, NPDES permits for discharge to waters of the U.S. (40 CFR 125.81). Discharges that are not to waters of the U.S., such as dischargers to POTWs and privately owned cooling lakes, are not subject to the provisions of this regulation. Therefore, API supports EPA's proposal to exempt POTWs from the scope of this rule.

In the preamble EPA discusses discharges of cooling water to POTWs and why they should not be regulated by this proposed rule (65 FR 49069). EPA is correct in assuming that cooling water discharges to POTWs are small compared to the cooling water usage upon which this proposed rule focuses. Many POTWs will not accept significant quantities of cooling water because dilution of the 5-day biochemical oxygen demand (BOD5) in the sewage may make it impossible to meet the secondary treatment requirement of 85% removal.

EPA Response

No response necessary.

Comment ID 316bNFR.028.016

Subject Matter Code	7.42
Request for Comment: Higher Threshold for Smaller Withdrawal Percentages	

Author Name Roger Claff

Organization American Petroleum Institute

EPA should consider establishing an applicability threshold for this regulation based upon the amount of cooling water withdrawn from a surface water as a fraction of the amount of surface water available.

In the technology section of this rule, EPA has proposed cooling water intake design requirements based on the amount of available surface water from the source. For rivers and streams, these design requirements are 5% of the annual average stream flow and 25% of the 7-day, one in 10 year, low stream flow (7Q10). Similar requirements are proposed for lakes and estuaries. These fractional uses of total stream flow or water volume available would be more appropriate as cooling water intake flow thresholds than as a design basis for intakes, because they represent de minimis withdrawals of water that are unlikely to have any measurable adverse impacts on aquatic biota populations.

In the preamble, EPA suggests that it may consider using such a water availability applicability threshold in addition to the intake water flow threshold that it has proposed (65 FR 49068). However, EPA is proposing to use a value of 1% of the stream flow, lake volume, or tidal excursion volume in an estuary, as the threshold.

EPA has not provided any basis for any of these water withdrawal thresholds - not for best available technology or as an applicability criterion. In fact, the rulemaking record contains no data or evaluations by EPA that support the proposed design and applicability limitations on the proportional amount of cooling water that can be withdrawn from a surface water without an adverse environmental impact.

The fractional use thresholds proposed for best available technology are highly protective and are appropriate to use as applicability thresholds for the regulation. The proposed alternate 1% threshold (65 FR 49068) is overly conservative, is not technically justified by the rulemaking record, and should not be used as a criterion for determining the applicability of the rule.

EPA Response

See response to 316bNFR.012.009.

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold in the applicability provisions of the rule to provide some reasonable limit on the scope of the national requirements imposed under today's rule. However, using a percentage flow threshold in the applicability section of the rule would, unless the percentage is extremely low, allow large withdrawals on large water bodies with no applicable national standards, which EPA does not view as necessary consistent with the requirements and goals of section 316(b). In addition, facilities below and percentage flow applicability threshold would not be subject to the other requirements, such as intake

flow volume, and velocity, established in the rule.

Comment ID 316bNFR.028.017

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 7.51

Facilities Not Covered by Today's Proposal

EPA has correctly exempted governmental and private contract suppliers of water from this regulation.

The proposed rule applies only to facilities that hold, or will hold, an NPDES permit. API agrees with this limitation on the applicability of the regulation, which we believe is consistent with the statutory authority provided by the CWA. Section 316(b) clearly states that it is to be applied to point sources subject to Sections 301 and 306 of the CWA. It does not authorize applying cooling water intake water regulations to water suppliers that are not also subject to a point source discharge (NPDES) permit. Therefore, EPA has correctly exempted contract suppliers of cooling water, whether they are government or private, from this regulation.

EPA Response

However, section 125.81(b) also provides "use of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States." Thus, contract suppliers of cooling water are not exempt. The purpose of this provision is to prevent circumvention of the rule by creating arrangements to receive cooling water from an entity that is not a point source. EPA has exempted those new facilities which obtain cooling water from a public water system. 40 CFR 125.81(b).

Comment ID 316bNFR.028.018

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 18.0

Best Technology Available-Cost Considerations

EPA should base its selection of best technology available requirements to minimize adverse environmental impacts on economic feasibility and cost-benefit analyses.

In this proposal, EPA has evaluated the costs and benefits of various best technology available approaches. API supports EPA's use of costs and benefits in determining which alternatives for minimizing adverse impacts are appropriate for inclusion in the rule; although the value of EPA's analyses is diminished by the absence of a practical definition of "minimizing adverse environmental impacts," as we have stated earlier in these comments. We urge EPA to continue to utilize economic cost-benefit analyses as it evaluates best technology available, both for new and existing cooling water intake structures.

EPA Response

EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

For a discussion on EPA's position on adverse environmental impact, please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.028.019

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Roger Claff

Organization American Petroleum Institute

The regulation should be revised to address new cooling water intake structures on a case-by-case, site-specific basis.

The proposed regulation would shift current regulatory policy for cooling water intake structures from a site-specific, case-by-case analysis to a hybrid system with specific design requirements applicable to all cooling water intakes and site-specific evaluations to determine if more stringent requirements are necessary. The Agency's attempt to develop a one-size-fits-all regulation for cooling water intakes has resulted in a proposed regulation that will be unnecessarily expensive for some facilities. Facilities will have to implement overly conservative designs and controls, but these will not significantly reduce the need to collect site-specific information and perform case-by-case evaluations compared to current practices. Permitting authorities will still have to spend considerable time and effort to evaluate applications and supporting data.

The adverse environmental impacts of cooling water intakes are inherently site-specific and must be evaluated based on the specific physical and biological conditions and intake structure proposals at each location. API supports the risk-based, tiered approach for evaluating cooling water intakes that has been proposed by the electric power generation industry (Edison Electric Institute, Utility Water Action Group) as a scientifically-sound and practical approach for minimizing the adverse environmental impacts of cooling water intakes (65 FR 49082). This approach is site-specific, and uses the best scientific information and methods available to assure that adverse environmental impacts of cooling water withdrawals are minimized. We urge EPA to discard its proposed approach to regulating cooling water intakes and to adopt the alternative risk-based methodology recommended by the electric power generation industry.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule for information on why EPA is not adopting a case-by-case approach for today's rule. EPA discusses why it is rejecting the industry's two-track approach in the preamble to the final rule. EPA does not believe that the two-track approach as suggested by industry represents the best performance that is economically practicable and technically available.

The primary differences between the approach that EPA is promulgating and the approach industry suggested are: (1) the final two-track approach defines a different level of environmental performance as "best available technology for minimizing adverse environmental impact" for the "fast track" and (2) the final two-track approach contains a different way of measuring equivalence with the environmental performance of the "fast track" in the second track. In short, EPA prefers a more concrete and objective measure of best technology available for minimizing adverse environmental impact for the new facility rule than does the measure suggested by the industry proposal. See Section V.D. in the preamble to today's rule for further information.

Comment ID 316bNFR.028.020

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name Roger Claff
Organization American Petroleum Institute

EPA has not presented any data or analyses to support the proposed limitations on the quantities of cooling water that can be withdrawn from streams, lakes, and estuaries.

The proposed rule would limit the amount of cooling water that can be withdrawn from a surface water source as follows:

- Streams and rivers: 5% of annual average stream flow, 25% of 7Q10;
- Lakes: must not alter natural thermal stratification;
- Estuaries, tidal rivers: less than 1% of the volume of the water column.

As stated earlier in our comments, API cannot find any data or evaluations in the rulemaking record that scientifically justifies these design limitations. The preamble discusses these flow requirements, including possible alternate flow requirements (65 FR 49085). However, none of EPA's statements or conclusions are supported with any technical analysis or data. For example, EPA states that it considered alternate intake water flows for streams of 1%, 10%, and 15% and concluded that the two higher flow percentages would result in "decreased levels of protection" (65 FR 49085). Decreased levels of protection, however, should not imply that the higher intake flows result in adverse environmental impacts.

Evaluation of these proposed standards is severely hampered by the lack of a definition of adverse environmental impact. These proposed criteria are arbitrary and unsupported by any quantitative, or even semi-quantitative, comparison of the relative environmental impacts of these maximum design intake flows with any alternative flows.

EPA Response

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See ,# 2-029, 2-013L-R15 and 2-013J and the preamble to today's final rule for EPA's interpretation of adverse environmental impact).

Comment ID 316bNFR.028.021

Subject Matter Code	12.21
Thermal Stratification	

Author Name Roger Claff

Organization American Petroleum Institute

The intake water volume standard for lakes is not technically achievable and has not been scientifically justified by the Agency.

A strict interpretation of the proposed requirement to "not alter natural thermal stratification" in any lake is probably an unattainable standard. EPA's other design requirements strongly emphasize the benefits of locating an intake structure outside the littoral zone. This means that it will be located in deeper water where thermal stratification is most likely. Virtually any intake flow in such areas will alter thermal stratification in the immediate vicinity of the intake structure. The preamble (65 FR 49086) suggests that the intent of this provision is directed toward altering the natural thermal stratification of the entire lake, or at least a major portion of it. However, the regulation as written can be interpreted to require that no alteration of any type or size to the natural thermal stratification is allowed, even in the immediate vicinity of the intake structure. This standard is unachievable and should not be included in the final rule.

The preamble and support documents do not provide any scientific justification for this blanket prohibition of alterations to "natural" stratification. Instead, they only state that alteration of thermal stratification may also alter the dissolved oxygen concentration distribution in a lake. EPA has provided no data or evaluations that demonstrate that this limitation on any alteration of natural thermal stratification, no matter how small it may be in comparison to the total lake volume and surface area is necessary to prevent adverse environmental impacts.

EPA Response

EPA believes the natural thermal stratification of a lake, if present, influence the physical and chemical cycles of lakes, which, in turn, strongly govern their production, utilization, and decomposition. A facility with a disproportionately large water intake can adversely impact both primary and secondary production. EPA believes the intake capacity standard for lakes and reservoirs is economically practicable and technologically achievable for new facilities, and will result in an acceptable level of source water protection.

While no percentage restriction is included for lakes and reservoirs in today's final rule, new facilities located on a lake or reservoir are required to establish a maximum intake capacity that will not disrupt the natural thermal stratification or turnover pattern of the source waterbody where such stratification or turnover pattern is determined to be beneficial. EPA believes an "across-the-board" limit is unworkable for lakes and reservoirs since the concept of flow is inapplicable to a lake. In addition, EPA believes preserving some degree of the natural thermal stratification, if present, is desirable because of the increased cooling efficiency that can result. The thermal stratification standard, while different from the flow-based standards for estuaries and freshwater rivers, does limit a new facility to an intake capacity that will achieve an acceptable level of protection for the source water.

EPA expects new facilities located on a lake or reservoir to work in conjunction with the permitting authority to correctly determine what constitutes an unacceptable disruption of any natural thermal stratification or turnover pattern.

Comment ID 316bNFR.028.022

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA's technology alternative that would require zero cooling water intake is technically infeasible and has not been shown to be necessary to minimize adverse environmental impact.

In the preamble, EPA indicates that it is considering an alternative best available technology that would require zero cooling water intake (or near-zero) for all new sources (65 FR 49080-49081). EPA states that there are 60 electrical generation systems worldwide that use such systems (65 FR 49081).

EPA has not thoroughly evaluated the technical feasibility of such systems for manufacturing plants such as petroleum refineries, and admits in the preamble that dry cooling systems may not be technically and/or economically feasible for some locations and cooling requirements (65 FR 49081). Cooling requirements at petroleum refineries, chemical plants, and other manufacturing facilities are different from those of power generation and in some cases, are more demanding. Moreover, new facilities in such industries are often constructed in the warmer regions of the U.S., which further reduces the applicability of dry cooling (as EPA points out in the preamble).

EPA also failed to evaluate the technical feasibility of zero discharge of cooling water for offshore oil and gas exploration and production operations. API is not aware of any technically feasible, economically affordable zero discharge technologies that could be implemented on mobile drilling platforms. In the absence of an evaluation of the specific cooling water requirements of oil and gas exploration and production operations, EPA should promulgate a scientifically-supported regulation that would require zero discharge of cooling water for such operations.

EPA should not adopt zero cooling water intake as a requirement, because this technology is not economically feasible for all of the potential manufacturing cooling requirements and locations covered by this regulation. As such, zero cooling water intake is not a best technology available as specified in Section 316(b). EPA has also not shown that a zero cooling water requirement is necessary to minimize adverse environmental impact.

EPA Response

EPA agrees with the commenter that dry cooling systems are not technically and economically feasible for some locations and cooling requirements (such as at manufacturing facilities). See Section V.C of the preamble to the final rule. EPA also notes that operators may be limited by space and geometry to install air cooling systems in place of seawater cooling systems. EPA will examine all technical and economic data submitted by commenters (e.g., 316bNFR.503.011) in developing potential controls for offshore and coastal oil and gas facilities.

Regarding offshore oil and gas exploration. EPA has not included these types of facilities for this phase of the 316(b) rulemaking effort. See the preamble to the final rule, Chapter 6 of the Technical Development Document, and response to comment 316bNFR.022.002.

Comment ID 316bNFR.028.023

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

Author Name Roger Claff

Organization American Petroleum Institute

The definition of the littoral zone in the proposed rule does not recognize that site-specific conditions are important in determining whether near-shore areas are important in terms of the resident populations in a surface water body.

The best technology available provisions in the proposed rule are directly related to whether or not an cooling water intake structure is located within, or near, the littoral zone as defined at proposed 40 CFR 125.83. EPA has identified the littoral zone as the most productive area in all types of surface waters (65 FR 49083-49084). The Agency states that these near-shore areas are also the principal nursery areas for most aquatic species.

Because the littoral zone is considered to possess these important values to the aquatic ecosystem of every surface water, EPA's proposed regulation establishes a tiered approach for best technology available that specifies the most restrictive design standards for intake structures constructed in the littoral zone. Cooling water intake structures in streams and lakes that are constructed in deeper water some distance from the littoral zone (30 meters) would be subject to less restrictive design requirements. In tidal rivers and estuaries, there is no difference in the requirements because EPA considers the entire water body as possessing important ecological functions that must be fully protected.

The focus of the regulation on the littoral zone and the biological functions that it serves in aquatic ecosystems is appropriate. However, just because the littoral zone in a water body is usually where the highest productivity occurs and is a nursery for many aquatic species does not mean that the entire littoral zone in every surface water is essential to maintaining a balanced and productive aquatic population. In reality, the importance of any specific area of the littoral zone in a surface water to the overall productivity of the water body is highly site-specific. The proposed regulation assumes that the only important location criterion for siting a cooling water intake is whether or not it is in or near the littoral zone. The proposed regulation ignores the fact that some areas of the littoral zone in a water body may be more important in terms of biological function than others, and that certain areas of the littoral zone may contribute very little to the overall productivity and health of the aquatic biota populations in that water body.

The historic approach of site-specific review of new cooling water intake locations considered the importance of location (within or outside the littoral zone) when the potential for adverse environmental impact was evaluated. Such consideration is also necessary for future reviews, because it is not scientifically sound to assume that the entire littoral zone in every surface water must be protected to minimize adverse impacts. EPA has not shown in the rulemaking record that this level of protection in the littoral zone is required for all surface waters. The rule must be modified to account for site-specific factors that influence the importance of a specific littoral zone area to the overall aquatic biota populations in a surface water so that appropriate designs that will minimize adverse impacts can be implemented only when necessary.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent comparable performance in a given waterbody to reduce fish and shellfish impacts using alternative technologies or approaches, for intake capacity and velocity.

Comment ID 316bNFR.028.024

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

EPA's definition of the littoral zone is too broad and generic, and may potentially result in many areas being defined as littoral zone which may not be important to the protection of the aquatic ecosystem from adverse impacts.

EPA's definition of the littoral zone is the near shore area "extending from the level of highest seasonal water to the deepest point at which submerged aquatic vegetation can be sustained" (40 CFR 125.83). The definition goes on to give three criteria for determining the extent of the littoral zone: (1) where 1% of the incident light reaches the bottom; (2) where there is a significant change in bottom slope that results in a change in habitat and biota; and (3) where there is a significant change in the bottom substrate, such as from sand to mud.

This definition applies a "one size fits all" approach to the identification of areas of a surface water body that must be provided with the highest protection. However, these three criteria and this definition will often not fit actual conditions well. For example, some rivers are sufficiently turbid at all times of the year such that there are large areas that virtually never have submerged aquatic vegetation (either rooted macrophytes or periphyton). The near shore bottom substrate in some rivers also may not allow the development of submerged aquatic vegetation. In many western rivers, there is little slope change across the entire stream channel under most stream flow conditions. The definition appears to imply that if any of the three criteria are satisfied in a near shore area, the area is the littoral zone. In terms of EPA's intent for focusing on the littoral zone (productivity), such a broad definition of the littoral zone is not scientifically valid.

The determination of whether or not a specific near shore site is important to the overall biological productivity of the important aquatic populations of a surface water body should be made on a site-specific basis. The concept of the littoral zone as used in the proposed regulation should be eliminated and replaced with a requirement for a site-specific determination of the proposed location of a new cooling water intake structure. While such site-specific determinations will require more resources for both the regulatory agency and the regulated facility, this is the only scientifically supported approach to making a determination of whether or not a particular project in a specific location may have an adverse environmental impact.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.028.025

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

Author Name Roger Claff

Organization American Petroleum Institute

EPA's definition of the littoral zone for open ocean waters is scientifically unjustified.

EPA defines the littoral zone in ocean waters as "the photic zone of the neritic region." (65 FR 49116). It further defines the neritic region as the "shallow water or nearshore zone over the continental shelf." EPA's definition does not describe what "shallow water" or "nearshore region" mean in the context of open ocean waters. In the absence of a more quantitative definition, permit writers could consider any cooling water intake on an offshore drilling or production platform to be in the littoral zone and subject to the rule requirements requiring reduction of intake flows to those achievable with recirculating cooling systems and other structural controls. However, EPA has not documented that the cooling water intakes for offshore oil and gas exploration and production facilities have any adverse environmental impacts as defined in 316(b).

EPA's scientific basis for defining the littoral zone for open ocean waters as the entire photic zone over the continental shelf is not supported by the data or analysis in the public record. In the preamble EPA simply states that it is defining the littoral zone in open ocean waters as including all waters over the continental shelf (65 FR 49084). It states that in ocean waters aquatic life is concentrated in areas of converging ocean currents, kelp beds, reefs, and rocky shelves, and this statement constitutes the entire extent of EPA's basis for defining the extent of the littoral zone for open ocean waters. This statement does not constitute sufficient justification for including all ocean waters over the continental shelf in the littoral zone definition.

None of the environmental studies of impingement and entrainment that are referenced in the preamble to the regulation (65 FR 49073) to justify the requirements of this rule were performed in locations that are physically similar to the sites of offshore oil and gas exploration and production rigs. Also, all of the studies cited by EPA are inappropriate, as they apply to steam electric generating plants that use orders of magnitude more cooling water than the quantities used in offshore oil and gas exploration and production operations. Therefore, EPA has no scientific basis for the expansive definition of the littoral zone in open ocean waters, which from a practical standpoint will only apply to offshore oil and gas operations and not to steam electric generating plants.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.028.026

Subject Matter Code	11.3
Request for Comment: Fixed Distance from Shoreline Criteria	

Author Name Roger Claff

Organization American Petroleum Institute

API supports EPA's alternative of defining the littoral zone in open ocean waters as a distance of 500 meters from the shoreline.

EPA has indicated in the preamble that it is considering defining the littoral zones in all waters (rivers, estuaries, and open ocean) as a distance from the shoreline in order to simplify the application of the regulation (65 FR 49085). In open ocean waters, the littoral zone would be defined as the waters in the area between the shoreline and a distance 500 meters from shore. API supports this alternative for defining the littoral zone in open ocean waters because it is far less expansive than the proposed definition and protects the nearshore areas that are the most productive in terms of aquatic life.

We note, however, that there does not appear to be any scientific support for either definition of littoral zone in the record for the proposed rule. Because the entire concept of littoral zone protection is not well-supported by this rule, we reiterate our position that site-specific conditions should be the primary consideration for determining if a proposed cooling water intake will result in adverse environmental impacts.

EPA Response

Many commenters expressed concern over a specific area that would define the littoral zone in any waterbody. For this and other reasons, EPA has adopted an alternative regulatory structure in the final rule and will not set nationally defined areas within oceans where different requirements apply (i.e. for best technology available for minimizing adverse environmental impact). Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.028.027

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Roger Claff

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EPA's proposed cost estimate of $32,000 for the Source Water Baseline Biological Characterization Study is unrealistically low.

The proposed rule requires a Source Water Baseline Biological Characterization Study (study) be conducted over the course of at least 1 year prior to submission of the permit application. The study is to include species identification, population counts, and location mapping of all fish and shellfish eggs, larvae, post-larvae, juveniles, and adults within the source water body over the course of a calendar year. According to the proposed rule, new, site-specific studies are to be conducted, and historical records are to be reviewed. Submitted data must meet quality assurance criteria. To conduct such a study properly, ecological experts must be retained for the duration of the study, and on-going monitoring costs will be substantial.

In justifying its cost estimate of a mere $32,000 to conduct the study, EPA claims that the "scope and level of detail required in the Baseline Characterization Study is more limited than studies typically submitted." Yet the study is to be reviewed by EPA and other federal agencies, including the Fish and Wildlife Service, to identify and quantify the nature and extent of adverse environmental impact of a proposed cooling water intake structure, not yet in place or even sited. The proposed rule does not indicate how the study is to be "more limited in scope and level of detail," nor how such a limited ecological study can serve EPA's stated purpose.

In reality, EPA's proposed cost of $32,000 is far below the most optimistic cost estimate for a proper characterization study to meet EPA's objective. A more realistic cost estimate might well be on the order of ten times this cost or more.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.028.028

Subject Matter Code	12.4
Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility	

Author Name Roger Claff

Organization American Petroleum Institute

The proposed best technology available requirement that cooling water intake volume be limited to that equivalent to what is obtainable with a closed cycle recirculating cooling system has not been scientifically justified.

The proposed regulation would require new facilities that construct cooling water intake structures near or within the littoral zones of rivers and lakes, and anywhere in tidal rivers and estuaries, to limit their withdrawal of surface water to volumes that are equivalent to what is obtainable with a closed cycle recirculating cooling system (40 CFR 125.84). EPA is proposing this requirement based on its evaluation which purports to demonstrate that closed cycle cooling is economically feasible for all new facilities in any of the industries that it studied (65 FR 49087).

Because EPA has not developed a definition for adverse environmental impact, it is impossible to determine if such a blanket requirement is appropriate for all surface water intakes. EPA has not demonstrated that this proposed requirement is necessary to minimize adverse environmental impacts for all U.S. surface waters. In rivers with large flows, the use of closed cycle recirculating cooling systems is clearly not necessary to minimize adverse environmental impacts. For example, the harmonic mean stream flow (which is lower than the annual average) of the Mississippi River at Baton Rouge is 366,748 cubic feet per second (237,019 MGD). The 7Q10 flow is 91,741 MGD. A cooling water intake flow of 100 MGD would be 0.04% of the harmonic mean flow and 0.11% of the 7Q10 of the Mississippi River. Use of this fractional amount of the total river flow would not have any measurable adverse impact on the aquatic biota populations of the river. There is no environmental justification for requiring a closed cycle is such cases.

Likewise, there are locations on lakes, tidal rivers, and estuaries where once-through cooling water intakes may have no adverse effects on the resident aquatic biota populations. While EPA has focused on large (> 100 MGD) once-through cooling water intakes when it developed this rule, there are facilities that use much smaller amounts of once-through cooling water. New facilities that can withdraw once-through cooling water from a surface water while minimizing adverse environmental impacts should be permitted. There is nothing in Section 316(b) of the CWA that gives EPA the authority to eliminate the use of once-through cooling water systems.

While the Mississippi River may be an example of an extreme case in terms of available stream flow, it is not unique and it illustrates that a prescriptive requirement such as this cannot be justified for application for all new facilities. This is why a case-by-case approach is necessary to evaluate the design requirements for cooling water intakes at new facilities.

EPA Response

Please see responses to comments 316NFR.508.017 (rejection of sensitive waterbody approach), 316bNFR.029.013 (EPA's interpretation of AEI), and section VI.B.2. of the preamble for today's rule.

EPA disagrees that minimization of AEI can only be achieved on a site-specific basis. EPA believes that the two-track, technology-based framework described in today's rule will provide new facilities with the flexibility to minimize AEI through performance-based standards (Track I) or based on site-specific considerations (Track II) similar to those described by the commenter. Please see response to comment 316bNFR.014.013 for additional discussion.

Comment ID 316bNFR.028.029

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name Roger Claff

Organization American Petroleum Institute

The restrictive design criteria for new cooling water intakes in tidal rivers and estuaries, which apply to all regulated new facilities regardless of their intake water flow, have not been scientifically justified by EPA.

EPA's proposed regulation would require all cooling water intakes for new facilities to meet every proposed design standard, regardless of the amount of cooling water used, the location of the intake structure, or the sensitivity of the surface water ecosystem to such withdrawals (40 CFR 125.84(d)(1)). EPA's justification for these design requirements is that estuaries are highly productive biological resources that require maximum protection (65 FR 49078).

While API agrees that tidal rivers and estuaries, as a group, are highly productive in terms of their aquatic life populations, EPA has presented no data or analyses that support the premise that low cooling water intake volumes (<100 MGD) have had or are causing significant adverse environmental impacts on these biological resources. This aspect of the proposed rule is another example of where the Agency has extrapolated reported impacts to aquatic ecosystems that have been caused by very large intake water volumes to virtually any volume of intake water (EPA's proposed threshold is 2 MGD for rule applicability). Nowhere in the record for this regulation has EPA provided data or analyses that support its proposal. EPA has a duty to consider whether or not its proposed design criteria are necessary to minimize adverse environmental impacts as specified in Section 316(b). This does not mean that design requirements that are appropriate for facilities with intake water volumes >100 MGD are equally appropriate for an intake water volume of 30 MGD or less. EPA should make a demonstration that these design requirements are necessary to minimize adverse environmental impact from low intake flows before it adopts them as a final rule.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in comparable reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility. See response to comment 316bNFR.025.003.

With respect to the commenter’s assertion that EPA has not presented data to support that low cooling water intake volumes (< 100 MGD) cause significant adverse environmental impacts on biological resources in estuaries and tidal rivers EPA has added additional facility entrainment and impingement information, particularly for low-flow facilities, in Section III of today's preamble. As

discussed in Section III, the examples provided illustrate that entrainment and impingement losses in some cases can be substantial. Under Track I of today's rule, there is no distinction among the different waterbody types at which an intake may be sited. Thus, all intakes will be subject to the same technology-based performance standards that seek to minimize entrainment and impingement. Should a facility choose to follow Track II of today's rule, the facility can demonstrate that site-specific conditions and/or applied technologies will allow them to achieve a level of reduction in impingement and entrainment comparable to the same level achieved under Track I. Thus, today's rule provides a flexible option for facilities that do not project high impingement or entrainment losses within their respective waterbodies.

Comment ID 316bNFR.028.030

Subject Matter Code 13.1

Requirement of 0.5 fps

Author Name Roger Claff

Organization American Petroleum Institute

The requirement for a design intake velocity of 0.5 feet per second has not been demonstrated as necessary to minimize adverse environmental impacts.

EPA has proposed that cooling water intakes in what it defines as littoral zones must be designed to limit the velocity through the open areas of an intake screen to 0.5 feet per second (fps)(40 CFR 125.84). In the preamble (65 FR 49087-88), EPA cites federal guidance and a study on intake structures of thermal electric power plants as the basis for this proposed maximum velocity, which is supposed to allow free-swimming aquatic species to avoid impingement and entrainment.

EPA's data base is too meager to justify a uniform maximum intake velocity for cooling water intake structures. As representatives of the electric power industry have pointed out, the location and design of the structure and the composition of the aquatic community are the primary determining factors on the amount of impingement and entrainment that occurs at a given site. API supports the comments of UWAG and EEI on this issue and urges EPA not to adopt a uniform standard for intake velocity. Instead, facilities subject to the rule should be allowed to provide technical and scientific evaluations to justify their proposed intake structure designs.

EPA Response

EPA disagrees with the view that the Agency has failed to support its determination that design intake velocity should be limited to 0.5 ft/s for Track I facilities. See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

Finally, EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement.

Also see comments 316bNFR.068.080, 316bNFR.068.081, 316bNFR.068.082, 316bNFR.068.106, 316bNFR.068.107, 316bNFR.524.037, 316bNFR.524.038, 316bNFR.524.039, 316bNFR.524.040, 316bNFR.524.041, and 316bNFR.524.042.

Comment ID 316bNFR.028.031

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 13.1

Requirement of 0.5 fps

Evaluations performed for offshore oil and gas exploration facilities have been submitted to EPA by the Offshore Operations Committee. Offshore drilling rigs and platforms must use intake velocities of 2-5 fps to prevent fouling of the intakes and cooling systems by growth of marine organisms. Videotapes of these intake structures during operation (submitted to EPA by OOC {see attachments}) document that significant entrainment of marine life and consequent adverse environmental impacts are not occurring at these offshore sites. EPA must not adopt a final rule that would require offshore oil and gas operations to achieve design intake velocities of 0.5 fps in the absence of any studies which document that the existing designs result in adverse environmental impacts and that feasible alternatives are available to offshore facilities to meet the intake velocity requirements.

EPA Response

EPA recognizes that maintaining sufficiently high intake velocities is one possible solution for minimizing settlement by biofouling organisms. However, further research by the Agency suggests that this is not the most effective technique. Often, intake velocities are designed to be as low as possible to reduce the impingement and entrainment of aquatic organisms. Additionally, the intake systems of many facilities are unprepared to support such high intake velocities and would possibly require modifications in order to maintain such velocities. An analysis of facility survey data at existing facilities suggested that only 33 (3.4 percent) of 978 surveyed facilities have intake velocities of sufficient magnitude (greater than 5 ft/s) to inhibit biofouling. While EPA recognizes that there is a possibility for the increased use of biocides (the most common treatment method used in the United States and Europe), it should be noted that biocides are not the only treatment method. A variety of viable alternative technologies and management strategies for dealing with biofouling are available. Examples of these options include the use of construction materials that inhibit attachment of organisms, mechanical cleaning, and heat treatments. While no one strategy has been shown to be universally applicable, there are certainly affordable and implementable options. Maintaining a high intake velocity has not been shown to be the most effective way to control biofouling, since other methods have been shown to be more effective at a lower cost, especially in the context of new facilities. A facility that has yet to be constructed can integrate biofouling control technologies into its design and minimize the impacts of biofouling on normal operations.

Also see 316bNFR.022.002, 316bNFR.022.007, and 316bNFR.503.005 for the implications of this rule to offshore oil and gas facilities.

Comment ID 316bNFR.028.032

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 10.08

Option for Alternative Technology Requirements

As a matter of policy, API supports the provision which allows for the implementation of best technology available that is either more or less restrictive than the generally applicable standards.

Given the fact that every site for a cooling water intake is physically and ecologically different, it is appropriate to include a provision in the rule to allow flexibility to the permitting agency to adjust any generally applicable requirements to the needs of a specific site. Therefore, API supports inclusion of this provision in the cooling water intake rule.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and fast permitting, through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This two-track approach allows, under Track II , a case-by-case determination of best technology-available guided by the performance requirements specified in Track I. In addition, the final rule includes a provision that allows alternative requirements where compliance with the rule requirements would result in compliance costs wholly out of proportion to, or air emissions and/or energy impacts significantly greater than, those considered by EPA in establishing the requirement at issue. EPA did not adopt the two-track approach suggested by industry for the reasons specified in the preamble to the final rule.

Comment ID 316bNFR.028.033

Author Name Roger Claff

Organization American Petroleum Institute

Subject Matter Code 10.08

Option for Alternative Technology Requirements

The cost test for implementing less-restrictive technologies is too limiting and fails to recognize that site-specific conditions will often justify the implementation of such technologies.

EPA has specified that if alternative requirements that are less stringent than those specified in 40 CFR 125.84 are to be imposed, they may be approved only if it is demonstrated that compliance with the requirements would result in costs that are wholly out of proportion to the costs that EPA considered when the rule was developed (40 CFR 125.85(a)(2)). This cost test is very draconian and furthermore, the determination of what increased cost is "wholly out of proportion" is completely at the discretion of the permitting authority. This is an unnecessary and inappropriate requirement, given that at specific sites there may be little or no environmental impact of a cooling water intake.

As we have stated elsewhere in these comments, API believes that only a site-specific, risk-based approach is appropriate for addressing the requirements of Section 316(b). The location of an intake, the volume of cooling water that will be withdrawn, the nature of the ecosystem in the zone of influence of the intake, and many other site-specific factors determine what type of design is necessary to minimize adverse environmental impacts. EPA's proposed uniform design requirements are not based on any rational definition of adverse environmental impacts, and thus are overprotective for many sites. Because of this, the ability of a facility to obtain an alternative design requirement should be broad, provided it can be demonstrated that the objectives of Section 316(b) are achieved.

EPA Response

The final rule for new facilities adopts a two-track technology-based approach that balances the need to provide clarity, consistency, and fast permitting, through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This two-track approach allows, under Track II , a case-by-case determination of best technology-available guided by the performance requirements specified in Track I. EPA has rejected the risk-based approach in Track II because it believes the performance-based approach is more objective and provides greater certainty, and it is fairer to apply comparable requirements to all new facilities in either Track I or Track II. In addition, the final rule includes a provision that allows alternative requirements where compliance with the rule requirements would result in compliance costs wholly out of proportion to, or air emissions and/or energy impacts significantly greater than, those considered by EPA in establishing the requirement at issue. These requirements preserve the ability or a facility to obtain an alternative design requirement where justified pursuant to the rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jere W. Glover & Jonathan R. Pawlow

On Behalf Of:

Office of the Chief Counsel for
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Author ID Number:

316bNFR.029

Comment ID 316bNFR.029.001

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Subject Matter Code 23.4

Other Requirements (UMRA, RFA, SBREFA)

We are concerned that the rule could impose substantial compliance costs on small businesses and other entities, particularly those involved in manufacturing and the cogeneration and other power generation sectors, without demonstrated reductions in environmental risks. As discussed further below, we believe the Agency can do more to reduce burdens of the rule on small business entities and still reduce the risk of adverse environmental impacts from intake structures.

EPA Response

EPA disagrees with this comment. For a detailed discussion of EPA's position on this argument, please see the response to comment 316bFNR.012.005 above.

Comment ID 316bNFR.029.002

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Subject Matter Code 8.2

Identification of New Manufacturing Facilities

The proposed rule would apply the national requirements only to new facilities with a design intake water flow of greater than 2 million gallons per day ("MGD"), and where at least 25% of the intake water flow is for cooling purposes. The Agency also is contemplating applying the national requirements to new facilities located on waterbodies where the facility's design intake water flow is more than 1% of a waterbody's mean annual flow or volume, depending on waterbody type. EPA has estimated, in its economic and engineering analysis for the proposed rule, that 40 new power generation facilities and 58 new manufacturing facilities would be subject to the rule over the next twenty years. The Agency's estimates of new manufacturing facilities focused only on the largest four categories of industrial users of cooling water in the manufacturing sector. <FN 1>

Footnotes

1 EPA prepared estimates of anticipated new facilities in the paper and allied products (SIC 26), chemicals and allied products (SIC 28), petroleum and coal products (SIC 29), and primary metals (SIC 33) industry categories. The Agency did not specifically look at other manufacturing sector industries that are potentially significant users of cooling water, including food products, rubber and plastic products, fabricated metal products, and electrical equipment and components. These other manufacturing sectors include many small businesses, some of which also could become subject to this rule.

EPA Response

Data on industrial water use presented in Chapter 2 of the Economic Analysis shows that the Paper and Allied Products (SIC 26), Chemicals and Allied Products (SIC 28), Petroleum and Coal Products (SIC 29), and Primary Metals (SIC 33) industries account for approximately 90 percent of the water used for cooling purposes in the manufacturing sector. EPA analyzed those industries because they are most likely to experience adverse industry-level economic effects, based on their large-volume cooling water use.

EPA has conducted extensive outreach to industry associations and organizations to identify small-entity manufacturing facilities. Based on this outreach effort and a review of the industry-specific trade literature, EPA concludes that, although the exact number of facilities owned by small entities that would be subject to the rule is difficult to quantify, few, if any, small entities would be affected in the foreseeable future (see analysis in Chapter 8: Regulatory Flexibility Analysis/SBREFA of the Economic Analysis document). The small number of small entities subject to this rule in the manufacturing sector is not surprising because the facilities likely to be subject to the rule are large industrial facilities that are not generally owned by small entities. EPA believes that this rule will not have a significant economic impact on a substantial number of small entities since those facilities with less than or equal to a two (2) MGD flow would not be subject to the requirements of the rule. This minimum flow level exempts many facilities using small amounts of water, including facilities owned by small entities.

Comment ID 316bNFR.029.003

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Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The Rule's Proposed Applicability Thresholds Are Not Adequately Supported or Justified by the Scientific Information on Which the Agency is Proposing to Base the Rule.

We believe it is appropriate for the Agency to apply the rule only to new facilities that exceed minimum intake flow thresholds, since facilities with larger intake flows are more likely to cause adverse environmental impacts if left unregulated. However, we are concerned that EPA has not provided an adequate justification for its particular choice of thresholds. This is particularly disturbing because the rule, as proposed, could capture many more small businesses than EPA's analyses suggest, including small businesses in sectors not specifically considered by EPA. For example, the Agency did not specifically look at the food products, rubber and plastic products, fabricated metal products, and electrical equipment and components manufacturing sectors, each of which contains thousands of small businesses. (See U.S. Census Database for 1997, Employer Firms, Employment and Estimated Receipts by Employment Size of Firm; see also footnote 1, above.) Many of these small businesses are significant users of cooling water, some of which could become subject to this rule.

EPA Response

See response to 316bNFR.029.002.

Comment ID 316bNFR.029.004

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Subject Matter Code 23.4

Other Requirements (UMRA, RFA, SBREFA)

Furthermore, the significant costs associated with complying with the rule could erect a competitive barrier to small business by deterring new small businesses from entering into business activities that would require the use of cooling water in amounts above the thresholds. Alternate sources of water, including from public water systems or groundwater, also frequently are costly and do not provide for small businesses a feasible alternative to the use of surface water sources. In light of the inadequate evidence showing adverse environmental impacts at the low intake flows proposed, discussed further below, we believe the thresholds can be increased to minimize the rule's potential burdens on small business entities.

EPA Response

EPA disagrees with the comment that this rule could erect a competitive barrier to small business. As discussed in the response to comment 316bFNR.012.005 above and documented in the Economic Analysis document, small entities in the affected industries do not tend to build the types of facilities that are subject to this rule. This rule is therefore not likely to change the business behavior, including entry into markets, for small entities. Impacts on the few facilities that are owned by small entities are sufficiently low (below 1 percent of revenues in all cases) that they would not present a barrier to entry.

For further discussion of EPA's analysis of small entity impacts and measures to reduce the burden on small entities, see Chapter 8: Regulatory Flexibility Analysis in the Economic Analysis document and the response to comment 316bFNR.012.005 above.

Comment ID 316bNFR.029.005

Subject Matter Code	7.4
Water Withdrawal threshold	

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EPA is proposing to set the basic applicability threshold at 2 MGD to ensure that almost all cooling water withdrawn from surface waters nationwide is covered by a national regulation. (See Preamble, at 49,067-68.) The Agency believes the cooling water intake structure withdrawals that are at or below a 2 MGD threshold would generally only have a very small adverse environmental impact. (See id.) EPA believes that withdrawals greater than 2 MGD would have greater environmental impacts. (See id.)

Despite this, however, EPA's primary focus for the proposed rule appears to be on regulating major new facilities with substantial cooling water withdrawals. Virtually all of the information on environmental impacts relied on by EPA in the rulemaking materials is associated with major power plants with water intake flows substantially greater than the current 2 MGD size threshold. The Agency acknowledges that most of the case studies documenting impacts from cooling water withdrawals in the past have focused on facilities withdrawing very large amounts of water (in most cases greater than 100 MGD). (See Preamble, at 49,067-68.)

EPA also acknowledges that there is very little information currently available regarding the lower bound of withdrawals at which adverse environmental impacts might occur. (See Preamble, at 49,067-68.) The Agency only points to a single impingement and entrainment study for a proposed power generation plant (the proposed Athens Generating Company facility) in New York State<FN 2> in support of its belief that withdrawals greater than 2 MGD would have adverse environmental impacts. The study projected that fish mortalities would occur at that proposed facility, at a proposed maximum withdrawal rate of 7.5 MGD and a proposed 4.2 MGD average withdrawal rate. <FN 3>

There is serious reason to question, however, the significance of the mortality projections in that study. The study estimated the average aquatic impacts to young-of-year ("YOY") fish that would have occurred during 1981 - 1987 at the proposed plant under assumed "worst case" (cooling water withdrawal of 7.5 MGD) and "average" (cooling water withdrawal of 4.2 MGD) conditions.<FN 4> The estimated percentage reductions in fish for every species reported in the study, under both these "average" and "worst case" conditions, was substantially less than 1%.<FN 5>

EPA, however, takes the position elsewhere in the rule's Preamble that it considers a 1% reduction in the population of aquatic organisms to be "a reasonable means to protect about 99 percent of the organisms in the water column," and "a reasonable approach for defining adverse impact." (See Preamble, at p. 49,074.)<FN 6> Consequently, EPA does not consider reductions in fish populations of less than 1% to be an adverse environmental impact.

Since the Agency considers that reductions in the population of aquatic organisms of less than 1% does NOT constitute an adverse environmental impact, this one study (i.e., of the Athens plant) that the Agency uses to support a 2 MGD threshold does not, according to the Agency's own position, demonstrate the existence of adverse environmental impact at 2 MGD. Furthermore, the study does

not demonstrate the existence of adverse environmental impact even at the higher withdrawal flows of 4.2 MGD and 7.5 MGD.

Hence, EPA is unable to document any significant adverse environmental impact at water withdrawal volumes at or near the proposed threshold level of 2 MGD. Rather, the threshold figures appear to be set specifically to capture a significant number of facilities by the rule, rather than to focus on demonstrable environmental harm from withdrawals at the threshold level. In light of this, we are concerned that this proposal is not supported or justified by the scientific information on which the Agency is proposing to base the rule, and relatively small facilities with cooling water withdrawals as small as 2 MGD could be subjected to substantial compliance costs without any demonstrated reductions in environmental risk being achieved.

Footnotes

2 See the Preamble of the proposed 316(b) New Facility rule, at p. 49,068.

3 EPA 316(b) docket DCN 1-1039-TC; see also In the Matter of ATHENS GENERATING COMPANY, L.P. (Case #97-F-1563), Prepared Testimony of Edward W. Radle, Steam-Electric Unit Leader, New York State Department of Environmental Conservation (Feb. 10, 1999).

4 The following are the study's estimates of the average aquatic impacts to young-of-year ("YOY") fish that would have occurred during 1981 - 1987 at the proposed Athens Generating Station under "worst case" (cooling water withdrawal of 7.5 MGD) and "average" (cooling water withdrawal of 4.2 MGD) conditions, as reported by the New York Dept. of Environmental Conservation (see In the Matter of ATHENS GENERATING COMPANY, L.P. (Case #97-F-1563), Prepared Testimony of Edward W. Radle, Steam-Electric Unit Leader, New York State Department of Environmental Conservation (Feb. 10, 1999).):

SPECIES	Estimated Mean 1981-87	YOY Lost; Worst case (@7.5 MGD)	YOY Lost; Average case (@4.2 MGD)
	YOY Fish Population	[% of Total Population Lost]	[% of Total Population Lost]
American Shad	21,400,000	41,000 [0.19%]	23,000 [0.11%]
Alosa Spp.	1,110,000,000	3,151,000 [0.28%]	1,765,000 [0.16%]
Striped Bass	31,800,000	2,100 [0.006%]	1,200[0.0038%]
White Perch	37,900,000	39,000 [0.10%]	22,000 [0.058%]

5 The range of percentages under the "worst case" conditions was only 0.006% - 0.28%, and the range under the "average" conditions was an additional 44% lower, namely, 0.0038% - 0.16%. (See footnote 4.) The highest percentage estimated (0.28%) was under the "worst case" conditions. The proposed plant would withdraw 4.2 MGD on average, or 44% less than the maximum "worst case" conditions. Moreover, the proposed plant would withdraw the maximum capacity only a small percentage of the time, and there would be fewer than average numbers of eggs in the water column at the depth where the cooling water intake structure would be located even though the model used in the study assumed a uniform distribution. (EPA 316(b) docket DCN 1-1039-TC.)

6 The Office of Advocacy does not endorse this definition of adverse environmental impact, as it believes it to be too restrictive. However, EPA's definition illustrates how, even when the Agency's own proposed very conservative definition of adverse environmental impact is used, the study of the Athens plant still does not identify any significant adverse environmental impacts associated with water withdrawals of 4.2 or 7.5 MGD at the proposed facility. Predicted impacts at a 2 MGD withdrawal rate would have been even less.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and

entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.029.006

Subject Matter Code	7.4
Water Withdrawal threshold	

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EPA's current justification for the 2 MGD threshold is that it captures 99.97% of all cooling water flows. However, the 10 MGD threshold that we suggest below is equally supportable, since it captures 99.67% of the flow (only a 0.3% difference).

In the absence of any scientific evaluation on which to base the current threshold, we believe EPA should adjust the basic threshold in the rule to levels which are supported by the only existing information which indicates there may be a potential for problems at facilities well in excess of the currently proposed threshold. We believe the Agency should adjust the rule's basic 2 MGD applicability threshold to 10 MGD. The 10 MGD threshold is derived from the State of Maryland, which has the most comprehensive and technically based cooling water permit program in the United States. <FN 7> Withdrawals in the order of 10 MGD are more in line with the Agency's limited scientific information. Furthermore, a 10 MGD threshold would still cover 99.67% of all cooling water flows, as discussed earlier.

Footnotes

7 Maryland waives cooling water intake requirements for facilities withdrawing less than 10 MGD if the volume withdrawn is less than 20% of the streamflow for nontidal waters or the annual average net flow past the intake for tidal waters (see the Agency's economic and engineering analysis).

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow (estimated total flow is approximately 9 billion gallons per day) and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. These facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.029.007

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Subject Matter Code 7.4

Water Withdrawal threshold

Moreover, EPA should not adopt the 1% of mean annual flow or volume threshold it is contemplating because the Agency has provided no evidence that this level is needed to eliminate a problem. On the other hand, if there is evidence that a higher flow or volume threshold would solve a problem, a flow or volume threshold set at the higher level should be considered.

EPA Response

EPA has not adopted the intake flow provisions proposed for cooling water intakes located in estuaries and tidal rivers. Rather, the Agency has adopted a two-track rule that requires for intake flow, in Track I, reduction in flow commensurate with levels that could be achieved using closed cycled cooling, and in Track II, flexibility to optimize technologies to achieve a comparable level of performance. The final rule does include proportional flow requirements intended to ensure protection of the source water. See discussion in sections VI.C. and D of the rule.

Comment ID 316bNFR.029.008

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Subject Matter Code 7.4

Water Withdrawal threshold

Other commenters to this rule have submitted proposals to the Agency that recommend, in addition to adjusting the basic threshold to 10 MGD, adding a second tier to the applicability threshold for certain intakes of between 10 and 25 MGD (where such intake flows do not exceed 10% of a stream's 7Q10 flow, 10% of the mean annual volume of a lake or reservoir, or 10% or the volume of the water column near an intake in a tidal river or estuary). EPA should seriously evaluate such proposals for inclusion in the final rule.

EPA Response

EPA has evaluated such proposals. EPA examined the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. The Agency included proportional flow requirements in the rule, but did not make these applicability thresholds because the Agency did not believe this would result in clear standards that effectively promote use of best technology available. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see section VI.A.3.

Comment ID 316bNFR.029.009

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Subject Matter Code 7.4

Water Withdrawal threshold

EPA should adopt an absolute minimum flow threshold (such as 100,000 gallons/day, or higher, of water used for cooling purposes), in conjunction with the percentage of waterbody flow or volume threshold, to ensure that smaller new facilities located on fairly small waterbodies are not subjected to excessively stringent national standards. Smaller facilities are more appropriately addressed on a case-by-case basis, with any requirements specifically tailored to reflect site-specific conditions.

EPA Response

See response to 316bNFR.509.008.

Comment ID 316bNFR.029.010

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

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EPA Should Define a Cooling Water Intake Structure Where at Least 50% of the Withdrawn Water is to be Used for Cooling Purposes.

Section 316(b) of the Clean Water Act is aimed at regulating intake structures that withdraw cooling water, not process water. However, EPA currently is proposing to define a cooling water intake structure as any structure where as little as 25% of the withdrawn water is used for cooling purposes. Hence, many facilities, including those of small businesses, that use surface waters predominantly for process purposes would be subjected to the requirements of this rule that is supposed to regulate cooling water intake structures only.

It is not clear what or how much adverse environmental impact associated with cooling water withdrawals would be eliminated by such a standard. But it is clear that this standard could affect a significant number of small businesses. Again, this threshold figure appears to be set specifically to capture a significant number of facilities by the rule, rather than to focus on eliminating demonstrable environmental harm.

EPA should continue to define a cooling water intake structure as it did in the Agency's 1976 final rule and 1977 guidance, where at least 50% of the withdrawn water is to be used for cooling purposes. By increasing the percentage to 50%, compliance costs would be decreased by one-third, and at least half of the projected small manufacturing businesses' new facilities would be relieved of the rule's burdens.<FN 8>

Footnotes

8 Compliance costs would be decreased by one-third ($6.9 million reduced to $4.8 million), and at least two (of four) small manufacturing businesses' new facilities would be relieved of the rule's burdens, amounting to at least a 50% decrease in impacts to small businesses. (See p. 7-27 regarding the "50% option," and pp. 9-6 and 9-7, of the June 2000 economic and engineering analysis.)

EPA Response

EPA has performed an analysis included in the record for today's rule that evaluates the number of small business entities that will be covered under the rule, using a 25 percent threshold. EPA has determined that the number is small.

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities

use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

In addition, in the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.029.011

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Jere W. Glover & Jonathan R. Pawlow

Organization Office of the Chief Counsel for Advocacy, U.S. Small Business Admin.

EPA Needs to Clarify How the Percentage Use Threshold Would Be Applied at Facilities Which Use Withdrawn Water for Both Process and Cooling Purposes.

Many facilities use withdrawn water in varying proportions over time for process versus cooling purposes. Furthermore, industrial facilities often preheat process water with energy captured from operations inside the facility. A common way of doing this is to run the water first through a use where heat will be transferred to the water (such as in a steam condenser) and then use it for other for process purposes. Moreover, some facilities use process water to perform subsequent cooling functions. Such practices conserve both water and energy. If such uses of water would constitute a "cooling water" function for purposes of applicability of the 316(b) standards, then in some cases facilities would be compelled to cease these practices, with substantial adverse environmental and energy consequences.

For example, industrial facilities would need to separate their cooling water from their process water to meet the standards for cooling water intake structures, with the result that they would lose the benefit of recovering waste heat for process purposes. Moreover, the lost heat that was going into the process of water use would result in the increased burning of fossil fuels to make up for the additional heat required. This burning of additional fossil fuels would result in other adverse environmental impacts such as higher air pollutant emissions and creation of greenhouse gases. These unintended consequences to the environment are negative and should be considered in the evaluation of adverse environmental impacts under this rule.

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.029.012

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

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It is unclear how the rule's percentage use threshold would be applied at facilities where intake water is used in varying proportions over time for cooling versus process purposes, or where water may be used initially as cooling water and subsequently reused as process water in the plant. It is also unclear how the percentage use threshold would be applied at facilities that use withdrawn water only intermittently for cooling purposes (e.g., for makeup water).

EPA needs to clarify how the percentage use threshold would be applied at facilities which use withdrawn water in varying proportions over time for process versus cooling purposes. The percentage of use should be defined in terms of a long term average use at the facility, for example, an annual average. Where water is used initially as cooling water and subsequently reused as process water in the plant, or vice versa, such water should be excluded from the definition of cooling water, since it also serves a "process water" function. The Agency should encourage facilities to reuse water, because of the environmental advantages of reusing such water and capturing what would otherwise be wasted energy.

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.029.013

Author Name Jere W. Glover & Jonathan R. Pawlow

Organization Office of the Chief Counsel for Advocacy, U.S. Small Business Admin.

Subject Matter Code 9.4

Adverse Environmental Impact

EPA Needs to Provide a Reasonable Definition of "Adverse Environmental Impact" in the Rule.

The proposed rule does not define "adverse environmental impact." As a result, it is impossible to evaluate whether the technology-based approach proposed by the Agency in this rule would minimize adverse environmental impact at new facilities. The language of the Preamble and the rule seem to assume that the impingement and entrainment of organisms is in and of itself adverse environmental impact. Defining the mere existence of impingement and entrainment of organisms as adverse environmental impact is overly simplistic and ignores a number of important factors (including the severity of the impact with respect to the health of the resource, the reversibility of the impact and the survival rate of entrained organisms, and the ability to mitigate damage or restore the resource) that will determine whether or not an environmental impact is, in fact adverse. Because this definition ignores these factors, it will lead to expenditures of resources that are not justified by the benefits that result from those expenditures.

EPA Response

EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.). Thus, although EPA agrees that all of the potential types of adverse environmental impact fall within the definition of adverse environmental impact, EPA does not believe that impingement and entrainment should be excluded from the definition of adverse environmental impact. EPA's record documents the amount of impingement and entrainment that may occur if not controlled by providing some historical facility examples and documents the effects of this impingement and entrainment where such information is available (see Section III of the preamble to the final rule and Chapter 11 of the EEA). EPA believes that, especially for the new facility rule, measuring environmental performance in terms of reduction of impingement and entrainment is appropriate because measuring impingement and entrainment is quicker and has a higher degree of certainty than conducting population or ecosystem studies.

Comment ID 316bNFR.029.014

Author Name	Jere W. Glover & Jonathan R. Pawlow
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Subject Matter Code 9.4

Adverse Environmental Impact

A reasonable definition of adverse environmental impact needs to be provided in the rule so that there is a definitive endpoint for determining the efficacy of proposed requirements. Adverse environmental impact should take into account effects on the entire population of the aquatic community, and consider seasonal and natural variability and other appropriate site-specific conditions.

EPA Response

Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.029.015

Author Name	Jere W. Glover & Jonathan R. Pawlow
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Subject Matter Code 10.01

Regulatory Framework Options

Facilities Should Be Given the Option of Performing Site-Specific Ecological Assessments.

The application of uniform national standards, as EPA has proposed in this rule, likely will result in numerous instances where technology and other measures are required, even though little or no adverse environmental impacts would result.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to install technologies appropriate for site-specific conditions. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

Comment ID 316bNFR.029.016

Author Name	Jere W. Glover & Jonathan R. Pawlow
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Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

In instances like this, new facilities should be given the option of performing site-specific ecological assessments, which could show that there is no need for additional controls because the study demonstrates no significant ecological impact at the point of intake. These assessments would enable case-by-case "best technology available" determinations to be made. Under such case-by-case determinations, any technology requirements would be tailored to site-specific conditions so that the facilities are not burdened with requirements for their intakes in excess of what is needed to minimize adverse environmental impacts. The Agency should set reasonable eligibility criteria for small businesses and others to obtain case-by-case determinations.

EPA Response

EPA has taken into account the burden upon small businesses associated with implementing today's rule. First, Track I has subcategorized requirements for facilities with small flows. Facilities with intake flows between 2-10 MGD are not required to meet flow reduction requirements. Second, each facility has the ability to choose technologies that meet the requirements in the most cost effective manner while accounting for site-specific conditions. Third, the information required for submittal under Track I is minimal, reducing the burden upon small businesses.

See response to comment 316bNFR.008.007 and the preamble to today’s rule for further information on why EPA is not adopting a case-by-case approach for today's rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

James D. Schultz

On Behalf Of:

American Iron & Steel Institute

Author ID Number:

316bNFR.030

Note

Fully supports the comments made by AF&PA (316bNFR.062) and UWAG (316bNFR.068)

Comment ID 316bNFR.030.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name James D. Schultz

Organization American Iron & Steel Institute

The production of iron and steel by its very nature requires large quantities of cooling water. Many steel plants, particularly larger integrated facilities, have water intakes that have been in service for decades. In most cases, water is withdrawn for use as both process water and cooling water. Although the proposed rule addresses new cooling water intake structures, AISI members believe it is important to evaluate the proposal in the context of existing facilities as well because of rules that EPA is scheduled to propose for existing cooling water intake structures in the future. As such, the proposed rule is of vital concern to AISI members.

EPA Response

Today's final rule addresses only new facilities. Existing facilities will be addressed in Phase II of this rulemaking. EPA intends have a proposed rule for existing facilities signed by February 28, 2002, pursuant to the terms of the consent decree with the Riverkeepers, Inc.

Comment ID 316bNFR.030.002

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name James D. Schultz

Organization American Iron & Steel Institute

EPA Should Establish a Reasonable Threshold for the Applicability of These Rules

Decisions to promulgate this rule and another to be issued later pertaining to existing intake structures are prompted by concern that some very large intakes located in ecologically sensitive aquatic environments may be causing adverse environmental impacts. While we support the regulatory need to address significant potential for adverse environmental impacts where they exist, we believe EPA has overreached in its application of the rule to intake structures, whether new or existing, with little or no potential for causing such adverse impacts. As noted above, intake structures have been in place for many years, and there has been no evidence of adverse impacts for the vast majority of those facilities. As such, AISI believes the applicability threshold of 2 mgd, with the added requirement that the structure may withdraw no more than 10% of a stream's critical low flow, is unreasonably restrictive, even for new facilities where structures can be designed more economically to meet the proposed criteria. AISI supports the alternative threshold applicability language proposed in the AF&PA comments. We believe a more reasonable applicability threshold will provide adequate environmental safeguards without imposing unnecessary and excessive administrative and financial burdens on both regulatory agencies and industry.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA has concluded that the compliance costs for this rule are relatively low. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

Finally, it is also important to note that EPA has removed the low flow percentage threshold from proportional flow requirements of the rule. EPA believes the mean annual flow provides a sufficient measure of the conditions EPA seeks to protect.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.030.003

Subject Matter Code	7.1
Definition: New Facility	

Author Name James D. Schultz

Organization American Iron & Steel Institute

Definitions of New Facilities Need to be Clarified

While it is apparent from the preamble language that EPA intends to draw the necessary and essential distinctions between new and existing facilities, it is important that the language of the regulation itself make it abundantly clear that this regulation apply only to greenfield or stand-alone plants or those facilities that are substantially independent of existing facilities. Also, as noted and for the reasons stated in the AF&PA comments, it would be advisable to clarify that intake structures for new co-generation facilities serving existing facilities are not subject to being interpreted as new facilities with respect to this regulation.

EPA Response

The Agency has clarified the regulatory language in the definition of new facility to state that the rule applies only to greenfield and stand alone facilities and that the rule does not apply to new units that are added to a facility for the same general industrial operation. Thus, the definition of new facility is narrower than the definition of new source. In addition to being a greenfield or stand alone facility, the regulation cross-references 40 CFR 122.2 and 122.29(b)(1), (2), and (4) to define whether the facility is a new facility.

Under 122.29(b), a source is a new source if it meets the definition of new source in 122.2 (effectively, it discharges or may discharge pollutants, and its construction commenced after promulgation – or proposal in specified circumstances – of a new source performance standard) and it meets any of three conditions. The first is that the source is constructed at a site at which no other source is located (40 CFR 122.29(b)(1)(i)). The second is that the source totally replaces the process or production equipment that causes a discharge at an existing facility (40 CFR 122.29(b)(1)(ii)). The third is that the new source's processes are substantially independent of any existing source at the same site (40 CFR 122.29(b)(1)(iii)). EPA has revised the final rule to state that the new facility rule applies to greenfield facilities, described as facilities that meet the first and second conditions above, and stand-alone facilities, which are those that meet the third condition, provided these facilities meet other applicable conditions (i.e., commencement of construction after the effective date of the final rule, new or modified CWIS). Thus, the Agency believes the language of the regulation does make it clear that the rule applies to greenfield and stand-alone facilities or those whose processes are substantially independent of an existing facility at the same site. As commenters requested, EPA has further clarified the definition of new facility to include greenfield and stand-alone facilities, and has described each in the definition. In addition, EPA has added some examples to the regulatory section of the rule to serve as guidance regarding the definition of new facility under this final rule. These examples, as well as the rule and the preamble discussion, clarify the applicability of the rule, including its potential applicability to a new co-generation facility providing thermal energy to an existing industrial facility. With respect to co-generation facilities, they would be included in the definition of new facility if the facility is a separate and independent operation and the cooling water intake

structure used by the original facility is modified by constructing a new intake bay for the co-generation facility or is otherwise modified to increase the intake capacity of the cooling water intake structure.

Comment ID 316bNFR.030.004

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name James D. Schultz

Organization American Iron & Steel Institute

The Rule Needs to Recognize the Relationship Between Process and Cooling Water Usage at Manufacturing Facilities

As noted in the preamble to the rule, a single intake structure often serves to bring water into a plant for both process water and cooling water applications, and EPA's Section 316(b) jurisdiction is limited to cooling water. EPA proposes to address this issue by defining a cooling water intake as one where 25% or more of the water withdrawn is used as cooling water. In AISl's view, it is impractical to establish any single cooling water percentage as a limiting factor for a manufacturing facility because the relevant distribution of process and cooling water can vary widely from plant to plant. However, if any number is to be established, it would seem appropriate to set the value at 50% since that would define the intake as being predominantly a cooling water intake structure. With respect to the possible application of this provision to existing sources in the future, it should be noted that companies are continually striving to reduce process water usage, both to conserve resources and to meet increasingly tighter effluent standards. As process water is reduced, the percentage of intake water used for cooling water can potentially increase. If the percentage of cooling water triggering applicability of this rule is set too low, companies will lack the incentive to reduce process water consumption.

More importantly, however, there needs to be a recognition that water is typically used and reused repeatedly and in different ways within manufacturing facilities. Some process water may ultimately be used for cooling while some cooling water may ultimately be used as process water. Any rule that encourages the segregation and recirculation of cooling and process water will reduce this flexibility and tend to increase usage of both resulting in adverse environmental and economic consequences.

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.030.005

Subject Matter Code 15.11

Mandatory Approaches

Author Name James D. Schultz

Organization American Iron & Steel Institute

Restoration and Mitigation Requirements Are Inappropriate

EPA has no authority to require restoration measures because Section 316(b) only authorizes EPA to require the use of technology for cooling water intake structures. While AISI takes no exception to allowing regulatory authorities the flexibility to accept voluntary restoration or mitigation measures as an alternative to specified technological requirements for intake structures, we do not believe these measures to be within the common meaning of intake structure technology and do not think agencies can require those measures.

EPA Response

See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.030.006

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name James D. Schultz

Organization American Iron & Steel Institute

Adverse Environmental Impact (AEI) is Not Adequately Defined

Based upon the extensive work conducted by the Electric Power Research Institute to better define AEI, AISI supports and incorporates by reference the comments prepared and submitted by the Utility Water Action Group on this subject. AISI believes a proper definition of AEI is fundamental to the intent of any regulations established under the authority of Section 316(b) and supports the electric utility industry's concept of determining fish and aquatic health and vitality based on fish population rather than the fate of a single organism. AEI is by its very nature a site-specific determination, which makes a uniformly applied intake structure technology wholly inappropriate as a standard under 316(b). EPA's improper interpretation and its lack of understanding of this distinction is manifested in its requirement under Section 125.86-87, where biological studies are called for even if intake structures are designed in accordance with requirements of Sect 125.84. EPA appears to want it both ways. If an intake structure is designed for an intake velocity of 0.5 ft/sec, when the preamble states that fish can endure an intake velocity of 1.0 ft/sec, biological studies are neither necessary nor a wise use of resources.

EPA Response

Please see response to comment 316bNFR.507.004 (AEI).

EPA does not agree that a uniformly applied technology-based performance standard is inappropriate for new facilities. Under today's technology-based rule, we've established a two-track approach. Should a facility choose the Track I approach, they can implement each of the cited performance-based standards (see 125.84[b]) and no pre-operational biological monitoring will be required. Under the Track II approach, site-specific conditions assessed through biological monitoring can be used to demonstrate entrainment and impingement reductions comparable to those achieved under the Track I requirements (125.84[c]). Thus, under today's rule facilities may choose to implement Track I performance based standards or conduct site-specific biological monitoring under Track II to show comparable minimization of entrainment and impingement.

Comment ID 316bNFR.030.007

Author Name James D. Schultz

Organization American Iron & Steel Institute

Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

Section 125.84(e)(ii) is particularly problematic for the steel industry because it would restrict intake volumes based on that needed for make-up to closed-cycle recirculating cooling water systems. Most steel plants, because of their size and logistical factors within plant boundaries, have several cooling water systems with different chemical control or make-up requirements. It would be inappropriate for a permit writer to dictate limitations on cooling water intakes based on a common set of assumptions applicable to a single closed-cycle system. Moreover, a restriction on cooling water intake may affect the amount of process water that can be withdrawn from the same intake structure. AISI urges that this requirement be dropped from the proposed rule.

EPA Response

Since proposal, and based on comments received, EPA has determined that the manufacturing activities of cooling water recycling and/or reuse as process water are equivalent to closed-cycle recirculation for the purposes of meeting the flow reduction requirements of the Track I compliance option. Track II allows for new facilities to meet the entrainment reduction levels of Track I with or without the flow reduction requirements. See the preamble to the final rule.

Additionally, since proposal, EPA has determined that intake water that serves the dual purpose of process and cooling should be excluded from the calculation of the percent of cooling water through an intake. See the preamble to the final rule.

Through these changes to the applicability definitions and the compliance requirements of the rule, EPA incorporated the particular uses and needs of cooling water for manufacturing facilities. Therefore, the concerns of the commenter and the goals of the regulation have been met.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jere W. Glover

On Behalf Of:

U.S. Small Business Administration

Author ID Number:

316bNFR.031

Comment ID 316bNFR.031.001

Subject Matter Code	23.4
Other Requirements (UMRA, RFA, SBREFA)	

Author Name Jere W. Glover

Organization U.S. Small Business Administration

We are concerned that the rule could impose substantial compliance costs on small businesses and other entities, particularly those involved in manufacturing and the cogeneration and other power generation sectors, without demonstrated reductions in environmental risks. As discussed further below, we believe the Agency can do more to reduce burdens of the rule on small business entities and still reduce the risk of adverse environmental impacts from intake structures.

EPA Response

This comment is identical to comment 316bNFR.029.001 above. See response to comment 316bNFR.029.001.

Comment ID 316bNFR.031.002

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Jere W. Glover

Organization U.S. Small Business Administration

The Rule's Proposed Applicability Thresholds Are Not Adequately Supported or Justified by the Scientific Information on Which the Agency is Proposing to Base the Rule.

We believe it is appropriate for the Agency to apply the rule only to new facilities that exceed minimum intake flow thresholds, since facilities with larger intake flows are more likely to cause adverse environmental impacts if left unregulated. However, we are concerned that EPA has not provided an adequate justification for its particular choice of thresholds. This is particularly disturbing because the rule, as proposed, could capture many more small businesses than EPA's analyses suggest, including small businesses in sectors not specifically considered by EPA. For example, the Agency did not specifically look at the food products, rubber and plastic products, fabricated metal products, and electrical equipment and components manufacturing sectors, each of which contains thousands of small businesses. (See U.S. Census Database for 1997, Employer Firms, Employment and Estimated Receipts by Employment Size of Firm; see also footnote 1, above.) Many of these small businesses are significant users of cooling water, some of which could become subject to this rule.

Furthermore, the significant costs associated with complying with the rule could erect a competitive barrier to small business by deterring new small businesses from entering into business activities that would require the use of cooling water in amounts above the thresholds. Alternate sources of water, including from public water systems or groundwater, also frequently are costly and do not provide for small businesses a feasible alternative to the use of surface water sources. In light of the inadequate evidence showing adverse environmental impacts at the low intake flows proposed, discussed further below, we believe the thresholds can be increased to minimize the rule's potential burdens on small business entities.

Footnotes

2 See the Preamble of the proposed 316(b) New Facility rule, at p. 49,068.

3 EPA 316(b) docket DCN 1-1039-TC; see also In the Matter of ATHENS GENERATING COMPANY. L.P. (Case #97-F-1563), Prepared Testimony of Edward W. Rad1e, Steam-Electric Unit Leader, New York State Department of Environmental Conservation (Feb. 10, 1999).

4 The following are the study's estimates of the average aquatic impacts to young-of-year ("YOY") fish that would have occurred during 1981 -1987 at the proposed Athens Generating Station under "worst case" (cooling water withdrawal of 7.5. MGD) and "average" (cooling water withdrawal of 4.2 MGD) conditions, as reported by the New York Dept. of Environmental Conservation (see In the Matter of ATHENS GENERATING COMPANY; L.P. (Case #97-F-J 563), Prepared Testimony of Edward W. Radle, Steam-Electric Unit Leader, New York State Department of Environmental Conservation (Feb. 10,1999).)

Species	Estimated Mean 1981-87 YOY Fish Pop.	YOY Lost: Worst Care (@7.5 MGD) [% of Tota Population Lost]	YOY Lost: Average case (@ 4.2MGD) [% of Tota Population Lost]
American Shad	21,400,000	41,000	23,000

		[0.19%]	[0.11%]
Alosa Spp.	1,110,000,000	3,151,000	1,765,000
		[0.28%]	[0.16%]
Striped Bass	31,800,000	2,100	1,200
		[0.006%]	[0.0038%]
White Perch	37,900,000	39,000	22,000
		[0.10%]	[0.058%]

5 The range of percentages under the "worst case" conditions was only 0.006% -0.28%, and the range under the "average" conditions was an additional 44% lower, namely, 0.0038% -0.16%. (See footnote 4.) The highest percentage estimated (0.28%) was under the "worst case" conditions. The proposed plant would withdraw 4.2 MGD on average, or 44% less than the maximum "worst case" conditions. Moreover, the proposed plant would withdraw the maximum capacity only a small percentage of the time, and there would be fewer than average numbers of eggs in the water column at the depth where the cooling water intake structure would be located even though the MGDel used in the study assumed a uniform distribution. (EPA 316(b) docket DCN 1-1039-TC.)

6 The Office of Advocacy does not endorse this definition of adverse environmental impact, as it believes it to be too restrictive. However, EPA's definition illustrates how, even when the Agency's own proposed very conservative definition of adverse environmental impact is used, the study of the Athens plant still does not identify any significant adverse environmental impacts associated with water withdrawals of4.2 or 7.5 MGD at the proposed facility. Predicted impacts at a 2 MGD withdrawal rate would have been even less.

7 Maryland waives cooling water intake requirements for facilities withdrawing less than 10 MGD if the volume withdrawn is less than 20% of the streamflow for nontidal waters or the annual average net flow past the intake for tidal waters (see the Agency's economic and engineering analysis).

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA has concluded that the compliance costs for this rule are relatively low. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available. In addition, the rule is expected to regulate only a small number of facilities owned by small entities, representing a very small percentage of all facilities owned by small entities in their respective industries. The Agency

notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

For further discussion of these points, see Sections VI, A, 3 and X, D.

Comment ID 316bNFR.031.003

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Jere W. Glover

Organization U.S. Small Business Administration

EPA Should Define a Cooling Water Intake Structure Where at Least 50% of the Withdrawn Water is to be Used for Cooling Purposes.

Section 316(b) of the Clean Water Act is aimed at regulating intake structures that withdraw cooling water, not process water. However, EPA currently is proposing to define a cooling water intake structure as any structure where as little as 25% of the withdrawn water is used for cooling purposes. Hence, many facilities, including those of small businesses, that use surface waters predominantly for process purposes would be subjected to the requirements of this rule that is supposed to regulate cooling water intake structures only.

It is not clear what or how much adverse environmental impact associated with cooling water withdrawals would be eliminated by such a standard. But it is clear that this standard could affect a significant number of small businesses. Again, this threshold figure appears to be set specifically to capture a significant number of facilities by the rule, rather than to focus on eliminating demonstrable environmental harm.

EPA should continue to define a cooling water intake structure as it did in the Agency's 1976 final rule and 1977 guidance, where at least 50% of the withdrawn water is to be used for cooling purposes. By increasing the percentage to 50%, compliance costs would be decreased by one-third, and at least half of the projected small manufacturing businesses' new facilities would be relieved of the rule's burdens.<FN 8>

Footnotes

8 Compliance costs would be decreased by one-third ($6.9 million reduced to $4.8 million), and at least two (of four) small manufacturing businesses' new facilities would be relieved of the rule's burdens, amounting to at least a 50% decrease in impacts to small businesses. (See p. 7 -27 regarding the "50% option," and pp. 9-6 and 9-7, of the June 2000 economic and engineering analysis.)

EPA Response

See response to 316bNFR.029.010.

Comment ID 316bNFR.031.004

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Jere W. Glover

Organization U.S. Small Business Administration

EPA Needs to Clarify How the Percentage Use Threshold Would Be Applied at Facilities Which Use Withdrawn Water for Both Process and Cooling Purposes.

Many facilities use withdrawn water in varying proportions over time for process versus cooling purposes. Furthermore, industrial facilities often preheat process water with energy captured from operations inside the facility. A common way of doing this is to run the water first through a use where heat will be transferred to the water (such as in a steam condenser) and then use it for other for process purposes. Moreover, some facilities use process water to perform subsequent cooling functions. Such practices conserve both water and energy. If such uses of water would constitute a "cooling water" function for purposes of applicability of the 316(b) standards, then in some cases facilities would be compelled to cease these practices, with substantial adverse environmental and energy consequences.

For example, industrial facilities would need to separate their cooling water from their process water to meet the standards for cooling water intake structures, with the result that they would lose the benefit of recovering waste heat for process purposes. Moreover, the lost heat that was going into the process of water use would result in the increased burning of fossil fuels to make up for the additional heat required. This burning of additional fossil fuels would result in other adverse environmental impacts such as higher air pollutant emissions and creation of greenhouse gases. These unintended consequences to the environment are negative and should be considered in the evaluation of adverse environmental impacts under this rule.

It is unclear how the rule's percentage use threshold would be applied at facilities where intake water is used in varying proportions over time for cooling versus process purposes, or where water may be used initially as cooling water and subsequently reused as process water in the plant. It is also unclear how the percentage use threshold would be applied at facilities that use withdrawn water only intermittently for cooling purposes (e.g., for makeup water).

EPA needs to clarify how the percentage use threshold would be applied at facilities which use withdrawn water in varying proportions over time for process versus cooling purposes. The percentage of use should be defined in terms of a long term average use at the facility, for example, an annual average. Where water is used initially as cooling water and subsequently reused as process water in the plant, or vice versa, such water should be excluded from the definition of cooling water, since it also serves a "process water" function. The Agency should encourage facilities to reuse water, because of the environmental advantages of reusing such water and capturing what would otherwise be wasted energy.

EPA Response

See response to 316bNFR.029.011.

Comment ID 316bNFR.031.005

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Jere W. Glover

Organization U.S. Small Business Administration

EPA Needs to Provide a Reasonable Definition of "Adverse Environmental Impact" in the Rule.

The proposed rule does not define "adverse environmental impact." As a result, it is impossible to evaluate whether the technology-based approach proposed by the Agency in this rule would minimize adverse environmental impact at new facilities. The language of the Preamble and the rule seem to assume that the impingement and entrainment of organisms is in and of itself adverse environmental impact. Defining the mere existence of impingement and entrainment of organisms as adverse environmental impact is overly simplistic and ignores a number of important factors (including the severity of the impact with respect to the health of the resource, the reversibility of the impact and the survival rate of entrained organisms, and the ability to mitigate damage or restore the resource) that will determine whether or not an environmental impact is, in fact adverse. Because this definition ignores these factors, it will lead to expenditures of resources that are not justified by the benefits that result from those expenditures.

A reasonable definition of adverse environmental impact needs to be provided in the rule so that there is a definitive endpoint for determining the efficacy of proposed requirements. Adverse environmental impact should take into account effects on the entire population of the aquatic community, and consider seasonal and natural variability and other appropriate site-specific conditions.

EPA Response

Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.031.006

Author Name Jere W. Glover

Organization U.S. Small Business Administration

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Facilities Should Be Given the Option of Performing Site-Specific Ecological Assessments.

The application of uniform national standards, as EPA has proposed in this rule, likely will result in numerous instances where technology and other measures are required, even though little or no adverse environmental impacts would result. In instances like this, new facilities should be given the option of performing site-specific ecological assessments, which could show that there is no need for additional controls because the study demonstrates no significant ecological impact at the point of intake. These assessments would enable case-by-case "best technology available" determinations to be made. Under such case-by-case determinations, any technology requirements would be tailored to site-specific conditions so that the facilities are not burdened with requirements for their intakes in excess of what is needed to minimize adverse environmental impacts. The Agency should set reasonable eligibility criteria for small businesses and others to obtain case-by-case determinations.

EPA Response

See response to comment 316bNFR.029.016.

Comment ID 316bNFR.031.007

Author Name Jere W. Glover

Organization U.S. Small Business Administration

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

EPA is proposing to set the basic applicability threshold at 2 MGD to ensure that almost all cooling water withdrawn from surface waters nationwide is covered by a national regulation. (See Preamble, at 49,067-68.) The Agency believes the cooling water intake structure withdrawals that are at or below a 2 MGD threshold would generally only have a very small adverse environmental impact. (See id.) EPA believes that withdrawals greater than 2 MGD would have greater environmental impacts. (See id.)

Despite this, however, EPA's primary focus for the proposed rule appears to be on regulating major new facilities with substantial cooling water withdrawals. Virtually all of the information on environmental impacts relied on by EPA in the rulemaking materials is associated with major power plants with water intake flows substantially greater than the current 2 MGD size threshold. The Agency acknowledges that most of the case studies documenting impacts from cooling water withdrawals in the past have focused on facilities withdrawing very large amounts of water (in most cases greater than 100 MGD). (See Preamble, at 49,067-68.)

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with

determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.031.008

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Jere W. Glover

Organization U.S. Small Business Administration

EPA also acknowledges that there is very little information currently available regarding the lower bound of withdrawals at which adverse environmental impacts might occur. (See Preamble, at 49,067-68.) The Agency only points to a single impingement and entrainment study for a proposed power generation plant (the proposed Athens Generating Company facility) in New York State<FN 2> in support of its belief that withdrawals greater than 2 MGD would have adverse environmental impacts. The study projected that fish mortalities would occur at that proposed facility, at a proposed maximum withdrawal rate of 7.5 MGD and a proposed 4.2 MGD average withdrawal rate.<FN 3>

There is serious reason to question, however, the significance of the mortality projections in that study. The study estimated the average aquatic impacts to young-of-year ("YOY") fish that would have occurred during 1981 -1987 at the proposed plant under assumed "worst case" (cooling water withdrawal of 7.5 MGD) and "average" (cooling water withdrawal of 4.2 MGD) conditions.<FN 4> The estimated percentage reductions in fish for every species reported in the study, under both these "average" and "worst case" conditions, was substantially less than 1% <FN 5>.

EPA, however, takes the position elsewhere in the rule's Preamble that it considers a 1% reduction in the population of aquatic organisms to be "a reasonable means to protect about 99 percent of the organisms in the water column," and "a reasonable approach for defining adverse impact." (See Preamble, at p. 49,074.)<FN 6> Consequently, EPA does not consider reductions in fish populations of less than 1% to be an adverse environmental impact.

Since the Agency considers that reductions in the population of aquatic organisms of less than 1% does NOT constitute an adverse environmental impact, this one study (i.e., of the Athens plant) that the Agency uses to support a 2 MGD threshold does not, according to the Agency's own position, demonstrate the existence of adverse environmental impact at 2 MGD. Furthermore, the study does not demonstrate the existence of adverse environmental impact even at the higher withdrawal flows of 4.2 MGD and 7.5 MGD.

Hence, EPA is unable to document any significant adverse environmental impact at water withdrawal volumes at or near the proposed threshold level of 2 MGD. Rather, the threshold figures appear to be set specifically to capture a significant number of facilities by the rule, rather than to focus on demonstrable environmental harm from withdrawals at the threshold level. In light of this, we are concerned that this proposal is not supported or justified by the scientific information on which the Agency is proposing to base the rule, and relatively small facilities with cooling water withdrawals as small as 2 MGD could be subjected to substantial compliance costs without any demonstrated reductions in environmental risk being achieved. EPA's current justification for the 2 MGD threshold is that it captures 99.97% of all cooling water flows. However, the 10 MGD threshold that we suggest below is equally supportable, since it captures 99.67% of the flow (only a 0.3% difference).

Footnotes

2 See the Preamble of the proposed 316(b) New Facility rule, at p. 49,068.

3 EPA 316(b) docket DCN 1-1039-TC; see also In the Matter of ATHENS GENERATING COMPANY. L.P. (Case #97-F-1563), Prepared Testimony of Edward W. Rad1e, Steam-Electric Unit Leader, New York State Department of Environmental Conservation (Feb. 10, 1999).

4 The following are the study's estimates of the average aquatic impacts to young-of-year ("YOY") fish that would have occurred during 1981-1987 at the proposed Athens Generating Station under "worst case" (cooling water withdrawal of 7.5. MGD) and "average" (cooling water withdrawal of 4.2 MGD) conditions, as reported by the New York Dept. of Environmental Conservation (see In the Matter of ATHENS GENERATING COMPANY; L.P. (Case #97-F-1563), Prepared Testimony of Edward W. Radle, Steam-Electric Unit Leader, New York State Department of Environmental Conservation (Feb. 10,1999).)

Species	Estimated Mean 1981-87 YOY Fish Pop	YOY Lost: Worst Care (@7.5 MGD) [% of Tota Population Lost]	YOY Lost: Average case (@ 4.2MGD) [% of Tota Population Lost]
American Shad	21,400,000	41,000 [0.19%]	23,000 [0.11%]
Alosa Spp.	1,110,000,000	3,151,000 [0.28%]	1,765,000 [0.16%]
Striped Bass	31,800,000	2,100 [0.006%]	1,200 [0.0038%]
White Perch	37,900,000	39,000 [0.10%]	22,000 [0.058%]

5 The range of percentages under the "worst case" conditions was only 0.006% -0.28%, and the range under the "average" conditions was an additional 44% lower, namely, 0.0038% -0.16%. (See footnote 4.) The highest percentage estimated (0.28%) was under the "worst case" conditions. The proposed plant would withdraw 4.2 MGD on average, or 44% less than the maximum "worst case" conditions. Moreover, the proposed plant would withdraw the maximum capacity only a small percentage of the time, and there would be fewer than average numbers of eggs in the water column at the depth where the cooling water intake structure would be located even though the model used in the study assumed a uniform distribution. (EPA 316(b) docket DCN 1-1039-TC.)

6 The Office of Advocacy does not endorse this definition of adverse environmental impact, as it believes it to be too restrictive. However, EPA's definition illustrates how, even when the Agency's own proposed very conservative definition of adverse environmental impact is used, the study of the Athens plant still does not identify any significant adverse environmental impacts associated with water withdrawals of4.2 or 7.5 MGD at the proposed facility. Predicted impacts at a 2 MGD withdrawal rate would have been even less.

EPA Response

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, today's rule does not interpret AEI in this fashion.

For the purposes of today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall

communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.).

As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

Comment ID 316bNFR.031.009

Author Name Jere W. Glover

Organization U.S. Small Business Administration

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

In the absence of any scientific evaluation on which to base the current threshold, we believe EPA should adjust the basic threshold in the rule to levels which are supported by the only existing information which indicates there may be a potential for problems at facilities well in excess of the currently proposed threshold. We believe the Agency should adjust the rule's basic 2 MGD applicability threshold to 10 MGD. The 10 MGD threshold is derived from the State of Maryland, which has the most comprehensive and technically based cooling water permit program in the United States.<FN 7> Withdrawals in the order of 10 MGD are more in line with the Agency's limited scientific information. Furthermore, a 10 MGD threshold would still cover 99.67% of all cooling water flows, as discussed earlier.

Footnotes

7 Maryland waives cooling water intake requirements for facilities withdrawing less than 10 MGD if the volume withdrawn is less than 20% of the streamflow for nontidal waters or the annual average net flow past the intake for tidal waters (see the Agency's economic and engineering analysis).

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did examine the State of Maryland’s 10 MGD standard but did not find information that would support the use of this standard on a national basis. EPA did not select a 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under this threshold and would leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, only 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD, based in part on economic considerations.

For further discussion of these points, see Sections V and VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.031.010

Author Name Jere W. Glover

Organization U.S. Small Business Administration

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

EPA should not adopt the 1% of mean annual flow or volume threshold it is contemplating because the Agency has provided no evidence that this level is needed to eliminate a problem. On the other hand, if there is evidence that a higher flow or volume threshold would solve a problem, a flow or volume threshold set at the higher level should be considered.

EPA Response

See response to 316bNFR.012.009.

Comment ID 316bNFR.031.011

Author Name Jere W. Glover

Organization U.S. Small Business Administration

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

Other commenters to this rule have submitted proposals to the Agency that recommend, in addition to adjusting the basic threshold to 10 MGD, adding a second tier to the applicability threshold for certain intakes of between 10 and 25 MGD (where such intake flows do not exceed 10% of a stream's 7Q10 flow, 10% of the mean annual volume of a lake or reservoir, or 10% or the volume of the water column near an intake in a tidal river or estuary). EPA should seriously evaluate such proposals for inclusion in the final rule.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where the record shows the requirements are technically available, economically practicable, and the have acceptable non-water quality environmental impacts. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA has not adopted an intake flow threshold in the applicability section of the final rule. The final rule does include proportional flow requirements that have been demonstrated to be achievable at new facilities. See discussion in sections VI.C. and D of the rule.

Comment ID 316bNFR.031.012

Author Name Jere W. Glover

Organization U.S. Small Business Administration

Subject Matter Code 7.4

Water Withdrawal threshold

EPA should adopt an absolute minimum flow threshold (such as 100,000 gallons/day, or higher, of water used for cooling purposes), in conjunction with the percentage of waterbody flow or volume threshold, to ensure that smaller new facilities located on fairly small waterbodies are not subjected to excessively stringent national standards. Smaller facilities are more appropriately addressed on a case-by-case basis, with any requirements specifically tailored to reflect site-specific conditions.

EPA Response

See response to 316bNFR.509.008.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Reed W. Super

On Behalf Of:

Riverkeeper

Author ID Number:

316bNFR.032

Note

No comments coded for this letter, as it was replaced by later submissions. Riverkeeper comments are coded under 316bNFR206. The attachment from Pisces Conservation is available as 316bNFR032_Pisces and Tellus as 316bNFR032_Tellus.

Comment ID 316bNFR.206.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Reed W. Super

Organization Riverkeeper

No comments coded for this letter, as it was replaced by later submissions. Riverkeeper comments are coded under 316bNFR206.

Footnotes

2 Section 316(b) requires regulations addressing cooling water intake structures within the mandatory time limits of Sections 301 and 306, which for new facilities was January 18, 1974. 33 U.S.C. § 1326(b); 33 U.S.C. § 1316(b)(1)(A), (B).

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Illegible

On Behalf Of:

National Petrochemical & Refiners
Association (NPRA)

Author ID Number:

316bNFR.033

Note

Fully supports the comments made by API (316bNFR.028) and AF&PA (316bNFR.062)

Comment ID 316bNFR.033.001

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Illegible

Organization National Petrochemical & Refiners Association (NPRA)

EPA must define "Adverse Environmental Impact."

EPA has not defined "adverse environmental impact" in this regulation. To minimize the "adverse environmental impact," Section 316(b) of the Clean Water Act requires use of the best technology available for cooling water intake structures. The proposed rule specifies very conservative design standards, rather than providing guidance for determining adverse environmental impact.

In most instances, it appears that the rule is structured to protect individuals of species, rather than aquatic communities. The object of this rule should be to protect the biological populations of surface water bodies from adverse impacts. In the absence of a definition of adverse environmental impact, it is impossible to determine the best technology available, its cost, and its effectiveness. Adverse environmental impact must be defined based on effects on aquatic communities, not effects on individual organisms.

NPRA suggests that EPA should review the studies conducted by EPRI and the electric utility industry, which define adverse environmental impact through fish population studies. We believe that these studies provide a scientific basis for defining impact, rather than what appears to be arbitrary determinations of adverse environmental impact based on the impingement or entrainment of one fish, as proposed in this rulemaking.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.033.002

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Illegible

Organization National Petrochemical & Refiners Association (NPRA)

NPRA agrees with the concept of a de minimis flow, or threshold, for applicability purposes; however, we suggest an intake water flow threshold on the order of 25 million gallons per day (mgd) instead of the proposed 2 mgd.

EPA is proposing that the technology requirements of the proposed rule would apply to all new cooling water intake structures with design flows of 2 million gallons per day (mgd) or greater, but has requested comment on this rate and alternate flow thresholds up to 30 mgd.

In the preamble, EPA concedes that there is very little information on entrainment and impingement impacts for intake water flows less than 100 mgd. The proposed threshold of 2 mgd appears to be arbitrary, and is completely unsupported by any of the entrainment and impingement studies cited by EPA in the proposed regulation. The studies are all on large facilities in the electric power generation industry and cannot be used to justify the 2 mgd threshold. The Agency's examples, in the preamble, of instances where cooling water intakes have caused documented impacts on aquatic populations, are all for facilities where the intake water flows are greater than 100 mgd. Two studies cited at lower rates (one at 20 mgd in Michigan and another at 4.2 mgd in New York) have no documentation of any significant adverse environmental impacts on the aquatic populations in the surface waters from which the water is withdrawn.

NPRA believes that significant adverse environmental impacts due to cooling water intakes at rates below 25 mgd are rare and highly site-specific. Further, EPA has documented in the preamble to the proposed regulation that a threshold of 25 mgd would regulate 99.1% of the cooling water used by the regulated industries.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18

percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

Nor does EPA agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.033.003

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

Author Name Illegible

Organization National Petrochemical & Refiners Association (NPRA)

EPA should regulate cooling water intakes that are subject to the rule on a site-specific basis.

NPRA believes that site-specific conditions are the most important determinants of whether or not entrainment and impingement in a cooling water intake will have an adverse environmental impact on the aquatic community at the site. Each site must be evaluated based on the specific physical and biological conditions and intake structure proposals at that location. We support the risk-based, tiered approach for evaluating cooling water intakes proposed by the electric power industry (Edison Electric Institute, Utility Water Action Group) as a scientifically-sound and practical approach for identifying the adverse environmental impacts of cooling water intakes.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. The two-track approach allows a new facility to demonstrate BTA on a site-specific basis, provided the facility achieves the requisite level of performance.

Comment ID 316bNFR.033.004

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Illegible

Organization National Petrochemical & Refiners Association (NPRA)

NPRA supports EPA's proposed definition of a new cooling water intake structure for the purposes of determining the applicability of the proposed rule.

We support EPA's application of this rulemaking only to new cooling water intake structures. Therefore, reconstruction or replacement of an intake structure at an existing source should not be subject to the proposed rule. EPA has stated that requirements for existing facilities must be different from those for new facilities, as retrofitting may be cost prohibitive or even impossible. We agree with that assessment, and intend to comment on a future rule for existing facilities. However, NPRA believes that the principles applied to this regulation are likely to be applied to a future rule affecting existing facilities.

EPA Response

The final rule apples to new green field or stand-alone facilities that use either a newly constructed cooling water intake structure or an existing cooling water intake structure whose design capacity is increased to accommodate the intake of additional cooling water. Replacement of existing cooling water intake structures will be addressed in Phase II or III. EPA is currently developing a proposed regulation applicable to existing facilities.

Comment ID 316bNFR.033.005

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Illegible

Organization National Petrochemical & Refiners Association (NPRA)

EPA's technology alternative that would require zero cooling water intake is technically infeasible and has not been shown to be necessary to minimize adverse environmental impact.

In the preamble, EPA indicates that it is considering an alternative best available technology that would require zero cooling water intake for all new sources.

For petroleum refineries and petrochemical plants (our members), zero cooling water intake (all air cooling) is neither technically nor economically feasible for most locations. These facilities require the condensing and cooling of light products, such as gasoline and liquefied petroleum gases, to 100 degrees F or lower. In most areas of the United States this is not achievable with air-cooled heat exchangers. Therefore, EPA should not adopt zero cooling water intake as a requirement, because this technology is not feasible for all of the potential manufacturing cooling requirements and locations covered by this rule.

EPA Response

EPA agrees with the commenter. See Section V.C of the preamble to the final rule.

Comment ID 316bNFR.033.006

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name Illegible

Organization National Petrochemical & Refiners Association (NPRA)

EPA has not presented any data or analyses to support the proposed limitations on the quantities of cooling water that can be withdrawn from streams, lakes, and estuaries.

The proposed rule would limit the amount of cooling water that can be withdrawn from a surface water source as follows:

* Streams and rivers: 5% of annual average stream flow, 25% of 7Q10;

* Lakes: Must not alter natural thermal stratification;

* Estuaries, tidal rivers: Less than 1% of the volume of the water column.

NPRA cannot find any data or evaluations in the rulemaking record that scientifically justifies these limitations.

EPA Response

EPA has dropped the 25% 7Q10 requirement for freshwater streams and rivers in today's final rule.

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.)

Comment ID 316bNFR.033.007

Subject Matter Code EXIST

Existing Facility Rule

Author Name Illegible

Organization National Petrochemical & Refiners Association (NPRA)

NPRA supports EPA's decision to limit this proposal to only new facilities, and to submit a separate proposal at a later date for existing facilities.

EPA Response

No response necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William L. Kovacs

On Behalf Of:

Chamber of Commerce of the United
States of America

Author ID Number:

316bNFR.034

Comment ID 316bNFR.034.001

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code OPP

General Statement of Opposition

The proposal would establish a complex, burdensome regulatory regime characterized by rigid, command-and-control technology requirements, and excessive pre-permitting studies. This new regulatory approach will preclude power plants from locating in many communities throughout the nation at a time that increased generating capacity is sorely needed. Siting opportunities for large and small manufacturers that require cooling water intake structures would also be diminished. In locations where intake structures will be allowed, proposed requirements would, if implemented, delay construction and exacerbate uncertainty. As a result of the proposals, cooling water intake structures will be significantly more expensive to construct and operate. Notwithstanding the burdens imposed by the proposed rule, EPA does not assert the environmental benefit the rule would provide.

EPA Response

See the preamble to the final rule for a response to each of these comments. EPA believes that by adopting a two track compliance approach facilities will have flexibility in choosing how to comply with the rule. EPA disagrees with the commenter that the facility regulations would severely limit siting locations for new electric power plants and manufacturing facilities. See the Final Economic Analysis for the rule. For a discussion of the technology-based approach to the rule that does not require EPA to demonstrate receiving water quality benefits, see the preamble to the final rule and response to comment 316bNFR.034.001.

Comment ID 316bNFR.034.002

Subject Matter Code	1.2
	Consent Decree

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

The U.S. Chamber recognizes EPA must promulgate a New Facilities regulation expeditiously to fulfill scheduling obligations of the Cronin v. Browner consent decree.<FN 1> However, EPA must not exploit the consent decree schedule to rush implementation of this seriously flawed proposal. The U .S. Chamber urges EPA to modify its proposal significantly to address the deficiencies set forth below.

Footnotes

1 65 Fed. Reg. 49062 (August 10,2000) See also: Cronin v. Browner, 90 F. Supp. 2d 364,373 (S.D.N.Y. 2000)

EPA Response

EPA disagrees that it has exploited the consent decree schedule to rush implementation of this rule. EPA believes that the approach it has taken is sound for the reasons set forth in the preamble and elsewhere in the record for this rule. The commenter's specific comments are dealt with in other portions of this comment response document.

Comment ID 316bNFR.034.003

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code 10.01

Regulatory Framework Options

EPA's proposals will significantly limit the siting of cooling water intakes.

Pursuant to CWA §316(b), EPA is authorized to regulate the "location, design, construction and capacity" of cooling water intake structures to ensure the "best technology available" is implemented to minimize "adverse environmental impact." <FN 2> Through an overly-strict application of the adverse environmental impact standard, cooling water intake structures would be precluded from shores throughout the nation.

As many as 200 power plants are expected to be constructed in the next two decades to meet rising energy demand. The New Facilities proposal would reduce opportunities to construct many new electricity generating facilities at a time when increased capacity is needed, and it would limit siting opportunities for new manufacturing facilities.

Footnotes

2 33 U.S.C 1326(b)

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

In the final rule EPA does not restrict where facilities can locate intake structures as long as the performance requirements of Section 125.84 are met.

Comment ID 316bNFR.034.004

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

EPA would establish burdensome oversight with uncertain benefit

The New Facilities proposal would establish rigid design requirements, accompanied by excessive pre-permitting study for all sites. This new regulatory approach would add delay and exacerbate uncertainty. Furthermore, the proposal would needlessly regulate facilities with inconsequential environmental impacts, unnecessarily restricts intake to one percent of stream flows and contains imprecise definitions that expand the breadth of this proposal beyond cooling water intake structures. These requirements will increase costs for the construction and operation of cooling water intake structures.

EPA Response

EPA believes that the two-track approach established today allows for design flexibility and does not establish rigid design requirements. The two-track technology approach serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. For new facilities subject to this rule EPA chose the two-track option as the Agency believes it represents the best technology available for minimizing adverse environmental impact.

The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of also allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II also provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

EPA has determined that the two-track approach is economically practicable for the industries affected by the rule. EPA believes it has set requirements based on available technology and economic practicality. Furthermore, BTA requirements were considered in the context of cost for the technology relative to the environmental benefit. See Section VIII of today's rule for a summary of BTA cost estimates and the Economic Analysis and Technical Development Document which support this rulemaking.

EPA believes this approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing new facilities. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

EPA believes it has presented substantial data documenting the AEI associated with cooling water intake structures in the proposed rule (Section VII) and again in Section III of the final rule. Potential benefits of the rule are discussed in Section IX of the final rule.

With regard to the comment that the breadth of the rule goes beyond cooling water intake structures EPA has clarified the definition of cooling water intake structure to explicitly include the first intake pump or series of pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed.

On the basis of the supporting data presented in the proposed rule and the NODA,EPA maintains the restriction of the design intake flow for estuaries and tidal rivers to no greater than one percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level.

Comment ID 316bNFR.034.005

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

Individual entrainment and impingement is not conclusive adverse environmental impact.

Although CWA §316(b) requires that EPA minimize "adverse environmental impact," the standard by which the Agency will determine whether a proposed cooling water intake structure will cause adverse environmental impact is not defined in the proposal. However, virtually any entrainment and impingement losses could be, and in many instances would be, deemed adverse environmental impact pursuant to EPA's proposal. <FN 3>

This strict adverse environmental impact standard is inconsistent with the Act. CWA §316(b) does not require elimination of the potential of entrainment and impingement for every individual fish, larvae or egg, but only the minimization of environmental impacts. Consequently, EPA must not employ a tally of entrainment or impingement to determine adverse environmental impact. EPA must revise the proposal to include a definition of adverse environmental impact or some other standard to ensure impacts will be assessed on a population or community basis.

Footnotes

3 33 U.S.C. 1326(b)

EPA Response

EPA does not agree that impingement and entrainment should be excluded from the definition of adverse environmental impact. Please see responses to comments 316bNFR.507.004, 316bNFR.068.007, and 316bNFR.068.008.

Comment ID 316bNFR.034.006

Subject Matter Code	21.0
	Cost/Benefit Analysis

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

EPA has not adequately considered costs and benefits of the proposed rule.

Executive Order 12866 mandates that agencies assess the costs and benefits of proposed rules, and base provisions of regulations on the:

[B]est reasonably obtainable scientific, technical, economical, and other information concerning the need for, and consequences of, the intended regulation." <FN 4>

In order to meet these obligations, EPA must provide additional information and conduct further analysis to address several deficiencies, such as:

* Insufficient data has been provided to demonstrate benefits;
* Little information regarding costs has been compiled;
* EPA has not considered or assessed their costs and benefits of a sufficient number of alternative technologies; and
* Technologies embodied in the proposal have environmental costs that EPA has not considered or addressed.

Footnotes

4 Exe. Ord. 12866 (September 30,1993)

EPA Response

EPA disagrees with the commenter's position that the costs and benefits of the rule have not been adequately considered. The total annual cost of the final rule is relatively low, less than $50 million per year, and thus EPA is not required to complete a formal benefits analysis under Executive Order 12886. Further, an accurate assessment of benefits requires facility-specific information regarding site characteristics. Because the new facilities expected to be in-scope of the final rule are projected facilities yet to be proposed or developed, the site specific data required to estimate benefits are not available. Moreover, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

With respect to compliance costs, EPA uses a larger sample of new facilities and more detailed information to develop the unit costs and assumptions for the final rule analysis compared to the proposal analysis. EPA feels that this larger sample and additional data allows for a more robust and representative basis for estimating the characteristics (including size and cooling system type) of new facilities which are in turn used as inputs to the calculation of compliance costs and impacts. For additional information regarding the estimation of facility compliance costs please see Chapter 6: Facility Compliance Costs of the Economic Analysis.

EPA also disagrees with the commenter's claim that EPA has not considered costs associated with a sufficient number of alternative technologies. EPA considered and analyzed several technology-based regulatory options to determine the best technology available for minimizing adverse environmental impact for new facilities (see comment 316bNFR.068.337).

EPA disagrees with the comment that the rule does not considered the environmental costs associated with BTA technologies. EPA has considered these costs and believes that the technologies determined to be BTA have acceptable non-aquatic environmental impacts. The non-aquatic environmental impacts are associated with increased air emissions (SO2, NOX, CO2, and Hg) resulting from cases where facilities with once-through cooling systems are required to install recirculating systems with cooling towers. The increased SO2, NOX, CO2, and Hg attributed to facilities that would be required to install wet cooling towers in lieu of once-through cooling systems is negligible in comparison to the total annual air emissions from new power plants.

Comment ID 316bNFR.034.007

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

EPA must assess site-specific conditions to ensure intakes would not have adverse environmental impacts

The U.S. Chamber urges EPA to modify the New Facilities proposal to include two options to enable full and fair site-specific analyses: <FN 5>

* The first option would allow EPA to assess the potential of proposed cooling water intake structures to cause adverse environmental impact and, if necessary, allow applicants to implement the best technology available to minimize impacts.
* The second option would provide incentives to promote implementation of proven, highly protective technology. This incentive-based option would minimize regulatory review.

This two-track approval process would have several advantages. Project applicants would be permitted to implement conservative, approved technology, or conduct detailed analyses to determine and implement other best technology measures to minimize adverse environmental impact. Furthermore, this two- track rule would be consistent with EPA's long-term strategy of emphasizing market incentives rather than command-and-control requirements.

Footnotes

5 On this matter, the U.S. Chamber urges EPA to consider recommendations of the Utility Water Act Group ("UWAG"). This group is made up of professionals with vast experience on cooling operations, intake structures and the aquatic environment. UWAG proposes modifications to the proposal that would establish an effective framework to ensure intake structures are regulated in an appropriate manner without unnecessary burdens to the private sector or federal and state government regulators. See "Comments of the Utility Water Act Group on EPA's Proposed §316(b) Rule For New Facilities, 65 Fed. Reg. 49,060 (Aug. 10,2000)"

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. All cooling water intake flow results in the potential for impingement and entrainment. For this reason, EPA did not adopt an approach in the final rule that focuses primarily on assessing whether AEI is occurring. Rather, the rule establishes technology-based performance requirements and offers new facilities the option of meeting the required levels of performance through the use of those technologies that most effectively reduce harmful environmental impacts at their site. Track I of the two-track approach does, however, provide an incentive -- through faster permitting and certain permit conditions -- for implementing effective technologies.

Comment ID 316bNFR.034.008

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

EPA's revised process would focus regulation on extremely low impact intakes.

According to EPA, beyond the Cronin v. Browner consent decree, the Agency intends to update its review of cooling water intake structures to produce more consistent, less ambiguous results.. Currently, the Agency reviews the potential impacts of proposed intakes on a case-by-case basis in a procedure established in a 1977 draft guidance document.<FN 6> However, EPA has set an extremely low threshold for regulation that would add expensive and burdensome requirements on intakes with little environmental impact.

EPA proposes a two million gallon per day (“mgd”) threshold.

According to the Agency, EPA intended to exempt intake structures unlikely to cause an adverse environmental impact. In the proposal EPA exempted intakes with a capacity less that 2 mgd capacity from the design, operation, monitoring and maintenance requirements of the proposed regulation to allow EPA and state administrators to avoid reviewing projects with minimal environmental impact. The Agency maintains a threshold is necessary because: <FN 7>

The historical case-by-case approach requires significant resources on the part of regulatory authorities that must implement section 316(b) requirements. <FN 8>

Footnotes

6 65 Fed. Reg. 49074, See also "Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P .L. 92-500."

7 65 Fed. Reg. 49068

8 65 Fed. Reg. 49079

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden

associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see section VI.A.3 of the rule.

Comment ID 316bNFR.034.009

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

EPA's 2 mgd threshold is not supported by sound science.

The U.S. Chamber strongly supports thresholds and other provisions that exempt operations with little or no environmental impact. Furthermore, the U.S. Chamber is a longstanding advocate that all regulation must be based on the best available scientific data and analyses. However, the 2 mgd threshold of the New Facilities proposal is unnecessarily and arbitrarily low. EPA should not establish such a low threshold unless the Agency can demonstrate -through sound science -that such a limit is necessary to provide a clear environmental benefit. The Agency has not provided such information.

For decades, cooling water intake structures of various capacities have been used throughout the United States. Although data indicates that very large intake structures, particularly those located in ecologically sensitive areas, may result in adverse environmental impact, EPA concedes "there is little information currently available regarding" the impact of lower-capacity intakes. <FN 9>

When the Act was amended to add § 316(b), Congress was responding to studies from the 1960s that demonstrated that some large cooling water intake structures, which removed hundreds of millions of gallons a day, had significant impacts on aquatic biota. It would be inappropriate for EPA to employ concern about a few massive intake structures as the reason for imposing regulatory burdens on thousands of smaller cooling water intake structures, especially when there is a lack of data demonstrating that smaller structures have a significant effect on surface waters.

Footnotes

9 65 Fed. Reg. 49068

EPA Response

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds

would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.034.010

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

The 2 mgd exemption will not achieve EPA's intended result.

The 2 mgd threshold would not limit the burdens of the rule to only those intake structures with potential for meaningful adverse impact on the source water. EPA estimates a 2 mgd threshold would subject 99.97 percent of new facilities subject to new regulation.<FN 10> In the absence of data to support such a low threshold, an exemption of 0.03 percent of sources is preposterous. This threshold would also thwart implementation of the Agency's stated goal to "alleviate the [allocation of] significant resources on the part of regulatory authorities." <FN 11>

Footnotes

10 65 Fed Reg. 49068

11 65 Fed Reg. 49079

EPA Response

See response to 316bNFR.034.009.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

Comment ID 316bNFR.034.011

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

A series of higher thresholds is warranted.

The U.S. Chamber urges EPA to modify the current proposal to include greater capacity thresholds. Amending these provisions would diminish the regulatory burden on businesses, particularly small businesses, and on regulatory agencies, while focusing attention on those intake structures most likely to cause adverse environmental impact. This recommendation, if adopted, would allow potentially thousands of facilities to avoid oversight for intakes with little risk of environmental impact.

The 2 mgd threshold should be raised to 10 mgd without condition since EPA has provided no data demonstrating that intakes with such capacity pose a significant risk of causing adverse environmental impact. In addition, intakes with a capacity from 10 mgd to 25 mgd should not be subject to the New Facilities requirements if withdrawals would not exceed 10 percent of the critical low stream flow. Intakes of these specifications pose little threat to a healthy, productive aquatic community.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. At a threshold of 5 MGD, only 40 percent of nonutility facilities would be covered under this rule. Under a threshold of 10 MGD, 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. In addition, the trend in power generation is toward, on a per facility/per unit of output basis, a general reduction in cooling water intake flow levels over time. Combined-cycle gas turbines require less water per unit of electricity generated than coal-fired or nuclear facilities. For example, a 750 MW combined-cycle facility with evaporative cooling towers is estimated to require approximately 7 to 8 MGD and under a 10 MGD threshold would not be subject to this national rule. The Agency believes that, given the objective of section 316(b), it is undesirable to exclude such a large plant from this rule. As reductions in cooling water intake flow levels occur, the two MGD threshold also ensures that this rule can serve the State, Tribes, and permit applicants by assuring that permits for new facilities

comply with 316(b).

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA has concluded that the compliance costs for this rule are relatively low. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

No flow threshold has been added to the applicability provisions; proportional flow limits exist in the rule.

For further discussion of these points, see Sections VI.A.3., VI.H., and VIII.

Comment ID 316bNFR.034.012

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code EXIST

Existing Facility Rule

Similar provisions should be included in the anticipated existing facilities rule when it is proposed, the subsequent rule should focus on actual flow conditions. The existing facilities proposal should not be based on design flow because:

* Design flow may not be ascertainable for older facilities;
* Existing facilities may withdraw more water than the design capacity; and
* Design flow may substantially overstate the actual impact of many intakes.

EPA Response

EPA will properly consider issues addressing existing facilities in Phase II of this rulemaking.

Comment ID 316bNFR.034.013

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code 23.4

Other Requirements (UMRA, RFA, SBREFA)

EPA is required to consider impacts to small businesses

As required by the Small Business Regulatory Enforcement Fairness Act, EPA must more fully consider ways to minimize the adverse impact of its regulations on small businesses. The U.S. Chamber urges EPA to examine the impact of higher thresholds as part of this determination. Potentially, thousands of small businesses may construct cooling water intake structures that could be subject to the New Facilities proposal and existing structures regulation. Without a reasonable threshold, small businesses would be forced to prepare complicated and detailed technical analyses regarding the location, design, and operation standards of intake structures - the vast majority of which would demonstrate to have little adverse environmental impact.

EPA Response

The commenter misstates the requirements of the Regulatory Flexibility Act as explained in comment 316bFNR.012.005. EPA disagrees with the commenter's claim that "[p]otentially, thousands of small businesses may construct cooling water intake structures that could be subject to the New Facilities" rule. See also response to comment 316bFNR.012.005 above.

EPA has, in fact, fully considered ways to minimize the adverse impact of the final rule on small businesses, including alternative design intake flow thresholds. EPA's analyses found that under the 2 MGD threshold, very few facilities owned by a small business would be affected by the final rule. EPA's analysis of other thresholds, including 5 MGD and 10 MGD, showed that there would not be a significant change in the number of affected small entities. In addition, economic impacts on facilities with design flows between 5 and 10 MGD were found to be very low. EPA therefore believes that the design intake flow threshold of 2 MGD, established by the final rule, is reasonable and both economically practicable and environmentally protective.

Comment ID 316bNFR.034.014

Subject Matter Code 11.14

Littoral Zone in Oceans

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

The New Facilities proposal is based on flawed assumptions.

The Agency has failed to provide sound science to support other key provisions of the New Facilities proposal. For example, the proposed regulation is based on a series of assumptions that result in overly- conservative restrictions. Reliance on these assumptions would significantly limits shores and coastline areas where new cooling water intake structures could be constructed.

EPA Response

EPA understands that with the approach of today's rule, some locations may be restricted. However, owners and operators of new facilities have more flexibility in designing facilities that can meet the requirements of today's rule in a cost effective manner. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.034.015

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

EPA assumes entrainable eggs and larvae and impingeable fish are concentrated in certain areas.

EPA proposes more stringent regulation of structures in estuaries and the littoral zone to protect the higher concentrations of eggs, larvae and fish they assume to be in these areas. These assumptions are inaccuratre. Littoral zones and estuaries are not uniformly productive or sensitive. Factors such as the size of individual fish or whether the eggs of individual species sink or float in the water column are more exponent. Furthermore, a focus on the littoral zone would render large areas of coastline off limits to new electrical generation or manufacturing operations requiring cooling water intakes.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.034.016

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code 9.3

Documentation of I & E Impacts

EPA assumes all fish, eggs or larvae entrained or impinged will die.

The survival rates of entrained organisms vary greatly depending on the species, life stage, and characteristics of the cooling. According to data, survival rates are substantial in many cases.

EPA Response

EPA maintains that both impingement and entrainment survival depend on numerous factors including, but not limited to, the species of fish, life stage, swimming ability, and the type of technology employed at the facility to minimize impingement and entrainment. Moreover, EPA has provided documentation which demonstrates that entrainment mortality rates for selected species and life stages can be as high as 100 percent. As discussed in section VI.B.2.c of the preamble, a summary of entrainment mortality data from five Hudson River power plants indicated that mortality rates can be substantial. With respect to impingement mortality, EPA acknowledges that impingement survival can be high if appropriate technologies are in place. Conversely, impingement survival can be very low seasonally for some species such as bay anchovy and Atlantic menhaden. Today's rule seeks to minimize impingement and entrainment losses for all affected species.

See Response to Comment 316bNFR.501.015 and section VI.B of the preamble for additional discussion of this issue.

Comment ID 316bNFR.034.017

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code 9.4

Adverse Environmental Impact

Definition of adverse environmental impact should be established.

As previously noted, it is inconsistent with the Act to employ a tally of entrainment or impingement of individual organism to determine adverse environmental impact. The Agency must revise the proposal to include a definition of adverse environmental impact or some other standard to ensure adverse environmental impact analyses will be assessed on a population or community basis.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.034.018

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code 7.1

Definition: New Facility

Definitions of new and existing facilities must be revised.

The Agency must modify definitions to ensure that only facilities that are truly 'new" are regulated pursuant to the New Facilities proposal. For example:

* Revisions are necessary to ensure only intakes for proposed "greenfield" facilities and substantially independent facilities requiring new or expanded intake structures located on sites with existing operations are regulated.

* "Substantially independent" must be clarified so that it applies only to new facilities proposed for a site with existing operations that could practicably be located on an undeveloped site.

* The rule must specify that cogeneration plants will not be considered substantially independent from industrial facilities to which they provide thermal energy.

EPA Response

See responses to 316bNFR.030.003 and 012.011.

Comment ID 316bNFR.034.019

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

Process water used for cooling should be excluded.

Industrial facilities often preheat process water with energy captured from operations inside the facility. This process water is not usually taken and discharged directly from a waterbody. Typically, facilities first run water through a heat source, such as a steam condenser, before it is utilized for process. This practice conserves both water and energy. However, it is not appropriate to regulate this water through cooling water intake regulations.

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.034.020

Author Name	William L. Kovacs
Organization	Chamber of Commerce of the United States of America

Subject Matter Code OPP

General Statement of Opposition

Although the Cronin v. Browner consent decree dictates the promulgation schedule for the New Facilities proposal, it does not specify regulation content. In the time remaining before finalization, EPA must work to address the flaws set forth above. As stated, the current proposal would significantly restrict locations available for the siting of new power plants at a time when increased electricity production capabilities are needed. The New Facilities proposal would also restrict new manufacturing operations that require cooling water intakes. EPA has not provided data to demonstrate the necessity of these restrictions.

EPA must not finalize this proposal until a comprehensive analysis of the impacts, costs, and benefits of the proposal and alternative methods for implementation are developed. Furthermore, EPA must ensure thresholds, definitions, assumptions and other provisions of the regulation are fully supported by science.

EPA Response

EPA disagrees with the commenter that the final new facility regulations would severely limit siting locations for new electric power plants and manufacturing facilities. EPA has discussed the siting implications of the final rule in the "Technical Development Document "and the " Economic Analysis Document". EPA does not believe that the rule will restrict manufacturing operations that require cooling water intake based on EPA's record demonstrating that many new facilities would meet the capacity , velocity, proportional flow requirements, and design and construction requirements independent of this rule. The proportional flow requirement, which is based on location, is further supported by the performance of existing facilities, an overwhelming majority of which meet the requirement.

Comment ID 316bNFR.034.101

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name William L. Kovacs

Organization Chamber of Commerce of the United States of America

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Joe Mayhew & Tony Wagner

On Behalf Of:

American Chemistry Council

Author ID Number:

316bNFR.035

Comment ID 316bNFR.035.001

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 7.4

Water Withdrawal threshold

The American Chemistry Council strongly supports the inclusion of a threshold for application of the 316(b) standards for new facilities, which would avoid applying burdensome procedures to thousands of intake structures with little or no potential for causing adverse environmental impact. We believe that the proposed cutoff level of 2 million gallons per day (mgd), however, is too low to accomplish that task. Accordingly we urge EPA to revise this level and set a reasonable threshold for the application on these Section 316 (b) rules.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.035.002

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Joe Mayhew & Tony Wagner
Organization American Chemistry Council

The Agency Has Greatly Overestimated The Number Of Future New "Greenfield" Chemical Facilities.

The American Chemistry Council points out, contrary to EPA's assertions, that significant major new chemical industry construction at greenfield sites over the next decade is unlikely. However, we do believe that the proposed rule for new facilities contains a number of provisions that are worth of comment, especially as they relate to a threshold approach to determine the application of the 316(b) standard for new facilities. In general ACC strongly supports a threshold approach, yet, as outlined in the proposed rule we believe the Agency's 2 mgd cutoff will result in the application of 316(b) standards and requirements to many intake structures that have little or no potential for causing adverse environmental impact. As discussed in detail elsewhere in these comments, the Council urges EPA to reconsider its current 2 mgd cutoff and adopt a more realistic threshold level for new facilities as well as existing intakes.

EPA Response

See response to 316bNFR .035.004.

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Comment ID 316bNFR.035.003

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 7.1

Definition: New Facility

We maintain that EPA must clearly define the applicability of the proposed rule, so that it only covers a "greenfield" plant or a new, substantially independent plant co-located with an existing plant and requiring a new or expanded intake structure. EPA should make it clear that the "substantially independent" test criteria for this rule includes consideration of whether the facility owner could practicably locate the facility elsewhere, since EPA has based the proposed new facility requirements on the assumption that the owner has the option of choosing the location for the facility to allow him to comply with the intake structure location and operation requirements.

EPA Response

See responses to 316bNFR.030.003 and 012.011.

Comment ID 316bNFR.035.004

Subject Matter Code	8.2
Identification of New Manufacturing Facilities	

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

The Council has reviewed the Agency's economic analysis, Economic and Engineering Analyses of the Proposed 316(b) New Facility Rule, and maintains that the number of future "in-scope" chemical facilities (SIC 28) under this proposal have been greatly overestimated.

First, the Agency assumes that survey respondents that didn't specify their cooling water requirements use 25% or more of their surface water for cooling purposes (see Table 4B-2 in Chapter 4, part B, page 2). If just one of these respondents uses less than 25% of their surface water for cooling purposes, then the Agency overestimated the number of new "greenfield" facilities subject to the rule. EPA should go back to these survey respondents and ask them directly about their cooling water use.

Second, the Agency assumes that 50% of future demand growth in SIC 28 will be met by new facilities (see Chapter 5, page 12). The Agency does not cite any data to back up this contention. Indeed, the Agency is not even consistent in their use of this assumption across industrial sectors. For aluminum smelters, which -according to EPA- operate at a higher capacity utilization rate than chemical facilities, the Agency assumes that 0% of new demand will be met by greenfield facilities (see Chapter 5, page 16).

Third, the Agency assumes that future new facilities will have the same characteristics as the screener facilities (see chapter 5, page 16), even though the Agency acknowledges a trend in recent years toward re-circulation systems and way from once-through systems. An unbiased analysis entails extrapolation of this trend into the future. By not doing so, the Agency overestimates the baseline number of new facilities subject to the rule.

Together, these three assumptions overstate the number of new facilities in SIC 28. If the actual number of new facilities is very low, which the Council believes to be the case, then the need for a rule is in doubt. Office of Management and Budget guidelines for economic analyses state that regulation is justified only if there is a significant market failure. In the case of chemical manufacturers, the Agency has not demonstrated a significant problem posed by future new "greenfield" facilities.

EPA Response

In response to this and other comments, EPA has updated and revised its analysis of the projected number of new in-scope chemical facilities. Due to these revisions, the number of new chemical facilities projected to be in scope of this rule has decreased from 48 at proposal to 22 in the final rule analysis.

First, EPA has added data on the percent of surface water used for cooling purposes from the Detailed Industry Questionnaire: Phase II Cooling Water Intake Structures. These data were available for all existing chemical facilities that filled out the detailed questionnaire, operate a cooling

water intake structure, and hold an NPDES permit. EPA therefore no longer had to make an assumption about the percentage of surface water used for cooling purposes.

Second, in response to this comment, EPA has revised its assumption that 50 percent of growth in the chemical industry will be met by new facilities. Unfortunately, the commenter did not provide an alternative estimate. EPA therefore revised this estimate for the chemical industry to 25 percent. The Economic Analysis also presents the effect of using an alternative assumption with respect to the share of growth that comes from new facilities (37.5 percent, or the midpoint between the proposal analysis assumption and the final analysis assumption) in analyzing the costs of this rule.

Third, the § 316(b) Industry Survey provides the most reliable information on the cooling water use characteristics of chemical facilities. In the absence of better information (an analysis of trends was deemed too speculative, and the commenter did not provide more accurate information), EPA decided to maintain the conservative assumption that the characteristics of new chemical facilities will be similar to the characteristics of existing chemical facilities.

In summary, the changes EPA made to the analysis take into account the concerns expressed by this comment. As a result, the number of projected new in-scope chemical facilities has decreased from 48 in the proposal analysis to 22 in the final rule analysis. However, EPA disagrees with the commenter's assertion that the need for a rule is in doubt if the number of new facilities is low. EPA believes that issuing a rule to address new facilities partially fulfills its obligations under Clean Water Act section 316(b). Any facility that meets the in-scope requirements set forth in § 125.81 will have to comply with the rule, irrespective of the number of in-scope facilities in that industry.

Comment ID 316bNFR.035.005

Subject Matter Code EXIST

Existing Facility Rule

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

The New Facilities Rule Must Be Evaluated In The Context Of The Upcoming Proposal Related To Existing Facilities.

Even though the current proposal is aimed at new facilities and new cooling water intake structures, the Council suggests that many of the provisions in the new facility proposed rule must be viewed in terms of the upcoming proposal on existing intakes. As EPA is well aware, throughout the United States there are a variety of manufacturing facilities as well as utilities that utilize cooling water and therefore have some type of cooling water intake structure. Most of the existing intake structures have been in existence for decades, and those decades of experience have produced no evidence that there is widespread adverse impact to aquatic biota from these intake structures. Certainly, very large intake structures, especially if located in an ecologically sensitive zone, may result in adverse environmental impact. EPA's goal should be to assure that the resources of the regulatory agencies as well as regulated entities are focused on the type of situations that present significant potential for causing adverse environmental impact and therefore warrant further investigation.

EPA Response

EPA disagrees that there is no evidence of adverse impact to the environment due to the operation of cooling water intake structures. Today's final rule for new facilities addresses cooling water intake structures at new greenfield and stand alone facilities only, but Phase II rules will address existing facilities. See preamble to today's rule for discussions on the purpose and basis for today's final rule.

Comment ID 316bNFR.035.006

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 7.4

Water Withdrawal threshold

The Council strongly believes that EPA must establish a practical and realistic threshold approach for both the new facility rule and the existing intake rule. This threshold approach would be used to determine which cooling water intake structures would be subject to the requirements of the Section 316(b) regulations.

EPA certainly has the discretion to set thresholds for regulation-it has done so in numerous effluent guidelines, and the concept is even endorsed in the NRDC v. Train consent decree, 8 E.R.C. 2120 (D.D.C.1979). EPA's establishment of size cutoffs for the new source review program under the Clean Air Act, for example, was upheld by the U.S. Court of Appeals for the D.C. Circuit, which found that EPA has inherent authority to decide not to impose requirements of a statutory program where "the burdens of regulation yield trivial or no value." Alabama Power v. Costle, 636 F.2d 323,361 (1979).

EPA Response

No response needed.

Comment ID 316bNFR.035.007

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 20.9

Other Federal Statutory Requirements (NHPA, ESA, CZMA, NEPA, etc.)

EPA also has a statutory obligation under the Small Business Regulatory Enforcement Fairness Act (SBREFA) to consider ways to minimize the adverse impact of its regulations on small businesses. We note that a significant amount of our member companies, approximately 45%, fall under the definition under SBREFA. Therefore, given the proposal's minimal and overly restrictive de minimus threshold cutoff levels, these member companies as well as thousands of small businesses that have cooling water intake structures could be swept into the 316(b) regulations if EPA does not set a reasonable threshold for regulation. Complying with this additional regulatory program, both in terms of the studies required and in terms of complying with location, design, and operation standards, would be a significant burden for all facilities, but especially for small businesses, and regulatory agencies would be diverted into assisting small businesses with complying with these unnecessary requirements, as well.

Accordingly, we maintain that EPA must adequately account for the potential effects of this rulemaking on small business and specifically consider many threshold options in that rulemaking process.

EPA Response

EPA disagrees with the comment that thousands of small businesses will be impacted by the rule. In accordance with the requirements of the Regulatory Flexibility Act, EPA has considered the economic impacts of the final rule on small entities. EPA's analysis shows that very few facilities owned by small entities will be affected by the rule, and that those that will be affected, will have very small economic impacts. The Agency has therefore certified that this rule will not have a significant economic impact on a substantial number of small entities (see also Chapter 8: Regulatory Flexibility Analysis in the Economic Analysis document).

The rule is expected to regulate only a small number of facilities owned by small entities, representing a very small percentage of all facilities owned by small entities in their respective industries. The absolute number of small entities potentially subject to this rule is low. This is not unexpected since the total number of facilities subject to this rule is also low (121 new in-scope facilities over 20 years). In addition, facilities that operate cooling water intake structures subject to this rule tend to be large industrial facilities that are generally not owned by small entities (see also Chapter 3: Profile of the Electric Power Industry and Chapter 4: Profile of Manufacturers in the Economic Analysis document).

A further reason why the final rule does not have a significant economic impact on a substantial number of small entities is that EPA has established a two MGD design flow threshold as the level below which facilities would not be subject to the requirements of the rule. This minimum flow level exempts many facilities using small amounts of water, including facilities owned by small entities. EPA also exempted electric generators with design intake capacities between 2 and 10 MGD from the most costly requirement of the rule (the recirculating requirement), further reducing the burden on

small facilities.

Comment ID 316bNFR.035.008

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

The Council supports a threshold approach, however, we believe the Agency's 2 mgd cutoff, as outlined in the proposed rule, will result in the application of 316 (b) standards and requirements to many intake structures that have little or no potential for causing adverse environmental impact. As discussed in detail elsewhere in these comments, the Council urges EPA to reconsider its current 2 mgd cutoff and adopt a more realistic threshold level for new facilities as well as existing cooling water intakes.

Additionally, we note that the rule would cover smaller than 2 mgd facilities that withdraw more than 1% of the mean annual flow of a source water. We strongly believe that this additional provision will render the proposed de minimus threshold even less useful, without any environmental justification. If EPA adopts an appropriate definition of adverse environmental impact (as discussed below), focusing on effects on the indigenous population rather than effects on individual organisms, it should be clear that a one percent threshold is unnecessary, and unnecessarily low.

Indeed, EPA recognizes that a 2 mgd threshold would still leave almost all of the cooling water flows subject to regulation - 99.97 percent in EPA's judgment. 65 Fed. Reg. 49068. It should be obvious that, if exempting smaller sources has any legitimacy at all, as we (and apparently EPA) believe it does, a cutoff that removes only 0.03% of the intake water flows from the regulatory program is inadequate.

Moreover, EPA believes that a 25 mgd cutoff would still leave more than 99% of cooling water flows subject to regulation. The percentage would be even higher with the restriction ACC proposes below. Specifically that a facility not remove more than 10% of the 7Q10 stream flow. This would certainly limit the rule to intake structures with potential to warrant regulation, while dramatically simplifying implementation of the rule and minimizing its impact on small businesses.

The Council Urges EPA Adopt A Higher Applicability Threshold.

Based on information contained in the docket for this rulemakeing, the Agency could choose an applicability threshold of much more than 2 mgd and still capture the vast majority of cooling water. We note that at a 10 MGD threshold, EPA would still capture well over 99% of the cooling water and well over 70% of the facilities in all industries. At an applicability threshold of 25 MGD, the regulation would still capture over 99% of the flow and over 60% of the facilities in all industries.

If EPA were to adopt the alternative threshold approach as found below, an intake structure between 10 and 25 MGD would be exempt only if it withdraws less than 10% of the stream flow even at critical low flow (recognizing that low flow is often 5% or less of average stream flow). Such an intake would be unlikely to present a threat to maintaining a healthy, productive aquatic community.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA has not adopted an applicability threshold based on a percentage of mean annual flow. EPA has removed the low flow percentage threshold from proportional flow requirements of the rule. EPA believes the mean annual flow provides a sufficient measure of the conditions EPA seeks to protect. The Agency also notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.035.009

Subject Matter Code	125.81
Who is Potentially Subject to New Facility Rule	

Author Name Joe Mayhew & Tony Wagner
Organization American Chemistry Council

The Council suggests that the following language, if included in both the existing source and the new source cooling water intake structure regulations, would help minimize the regulatory burden on businesses, including small businesses, and on regulatory agencies. The proposed language would focus the appropriate attention on those intake structures that have some reasonable possibility of causing adverse environmental impact.

Accordingly, the American Chemistry Council recommends that the Agency adopt the following language and substitute it for the third clause to proposed 40 C.F.R. § 125.81:

This subpart does not apply to a new facility that proposes to use a cooling water intake structure with a design intake flow:
(a) less than or equal to 10 million gallons per day; or
(b) greater than 10 million gallons per day but less than or equal to 25 million gallons per day, provided that such flow does not exceed:
(1) 10 percent of the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically (7Q10) of the source water, for a non-tidal river, or
(2) 10 percent of the mean annual volume of a lake or reservoir, or
(3) 10 percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level, for a tidal river or estuary.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. In addition, the

trend in power generation is toward, on a per facility/per unit of output basis, a general reduction in cooling water intake flow levels over time. Combined-cycle gas turbines require less water per unit of electricity generated than coal-fired or nuclear facilities. For example, a 750 MW combined-cycle facility with evaporative cooling towers is estimated to require approximately 7 to 8 MGD and under a 10 MGD threshold would not be subject to this national rule. The Agency believes that, given the objective of section 316(b), it is undesirable to exclude such a large plant from this rule. As reductions in cooling water intake flow levels occur, the two MGD threshold also ensures that this rule can serve the State, Tribes, and permit applicants by assuring that permits for new facilities comply with 316(b). Similarly, EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. Nor does the final rule include a percentage flow threshold as part of the applicability provisions. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities. However, Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

Comment ID 316bNFR.035.010

Subject Matter Code 7.4

Water Withdrawal threshold

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

For new facilities, because there is no actual flow experience and the design flow is readily available, we agree with EPA's proposal to apply the threshold to intake design flow. When EPA develops a threshold for the existing facility rule, though, reliance on design flow would be inappropriate, for several reasons. For one, design flow may not be ascertainable for older facilities, and the facility may actually be withdrawing more water than the intake structure design flow. Most importantly, design flow will often substantially overstate the true impact that the intake structure has on the source water.

Many facilities have actual intake flows far below the intake structure design flow, either because the intake structure was "over-designed or because the facility has substantially reduced its water usage over time. Treating such an intake structure as if it really were withdrawing at a much higher rate and therefore as if it has greater potential to affect the source water would be unrealistic. Moreover, this situation could remove an incentive for further water usage reductions.

Therefore, the American Chemistry Council recommends that EPA substitute "actual intake flow" for "design intake flow" in the proposed regulatory language for existing structures and should also include a definition of that term. We suggest that "actual intake flow" be defined as "the highest 30-day average intake flow during the last 5 years." This is a number that should be easy for facilities to determine, and it would assure that any peak withdrawal periods are not being masked by a longer averaging period.

EPA Response

This rule applies to new facilities that use cooling water intake structures. The Phase II and III rules will address existing facilities.

Comment ID 316bNFR.035.011

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

In Determining If An Intake Is Primarily A "Cooling Water Intake" Or A "Process Water Intake" EPA Should Use "Major Use" Rather Than The Arbitrary 25% Value As Currently Proposed.

The Agency's proposed rule defines a cooling water intake structure as the total physical structure and any associated constructed waterways used to withdraw water from a water of the United States, provided that at least 25 percent of the water withdrawn is used for cooling purposes…….. As noted by EPA the definition wording "....of at least 25 percent of the water withdrawn is used for cooling purposes..." is a change from the 1976 final rule and 1977 draft guidance definition which stated that "...a facility used the major portion of water drawn through the structure." EPA also states in the proposed rule that "In practice many permitting authorities have interpreted that definition to apply to intake structures if a facility uses more than 50 percent of the water drawn…."

EPA states that the basis for the 25% figure is...(1) "EPA experience since the late 1970's". It is not fully understood what EPA is referring to related to "EPA experience" since no examples or discussion were provided and (2) "EPA chose twenty five percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two mgd total flow threshold...to ensure that most cooling water with drawn from waters of the US are addressed by these requirement for AEI." When Congress enacted section 316(b), it was responding to studies in the 1960s that found that some cooling water structures, removing hundreds of millions of gallons a day, were having an effect on the surface water biota. We believe that it is inappropriate for EPA to take that concern about a limited number of intake structures and use it as the reason for imposing regulatory burdens on thousands of relatively small cooling water intake structures, especially since, so far as we are aware, there is no evidence that these smaller structures have had any significant effect of surface waters.

Typically as the intake flows go up, the split between cooling water and process water widens: that is, the cooling water flows will start to dominate the water flows being withdrawn. Thus, as the intake flows increase more new facilities will be included regardless of the split between cooling water and process water. This 25% value will incorporate the smaller intake flows. The Council does not completely understand why EPA proposes 25% as the threshold, especially since the late 1970's EPA and the states have interpreted the threshold to be majority or 50% of intake water. We suggest that it was not the intent of Congress to evaluate the entire universe of cooling water intake structures for AEI but only those intakes of significance. The past interpretations have kept the definition of cooling water intake structure simple. The majority use of the intake water will label the use of the intake structure.

Additionally, many manufacturing facilities have made (or are in the process of making) changes to reduce the water usage, and a diversion of capital into another requirement will only delay process water reductions that would result in reduced water intake volume. Moreover, treating process water which also performs a cooling function as "cooling water" for purposes of applicability of 316(b) standards will in some cases compel facilities to cease this practice, with substantial adverse environmental and energy consequences. Therefore, the Council suggests that EPA add the following

language to the proposed definition of "cooling water":

"If heated water is needed for a manufacturing process, use of waste heat to heat that water does make that process water "cooling water."

Without this clarification to the definition or something like it, the 316(b) rules could have substantial adverse air quality and energy impacts, without producing any substantial reduction in the amount of water withdrawn by such industrial facilities.

Accordingly, we strongly recommend that the Agency adopt a threshold that is simple and in keeping with past (i.e., 1976 final rule and 1977 draft guidance) as well as current practices. Therefore we recommend that the Agency use a "major" use standard to determine if an intake in question is a cooling water intake structure. Thus, if the majority (>50%) of the water is used for cooling purposes, it is a cooling water intake structure, if the majority (>50%) of the water is used for process water, it is a process water intake structure.

EPA Response

EPA disagrees that it was the intent of Congress to regulate only the large cooling water users. The statutory language include no such limitation. Section 316(b) indicates that Congress intended to address adverse environmental impacts caused by cooling water intake structures, not merely the most significant impacts or the largest structures.

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

In addition, in the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is

considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.035.012

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 19.2

Baseline Biological Characterization Study

Source Water Baseline Biological Characterization Data Is Not Necessary For All New CWIS Facilities.

The Council recommends that EPA provide greater flexibility to the regulatory authority to determine when a baseline study is needed for a "new" cooling water intake structure.

The proposed time frame to perform a baseline study impacts a business's ability to respond to the market place, such as providing additional manufacturing capacity due to the long lead time to obtain a NPDES permit. A basline study requirement would at least double the time. The Council does not believe that a Baseline Characterization study is needed for all new cooling water intake structures, if highly protective technologies such as closed-cycle cooling is proposed to be used by the permittee.

Since EPA only requires 25% of the intake flow to be defined as a CWIS, only a intake flow of 250,000 gpd would be required to fall under the "new" CWIS proposed regulations, if 2 mgd of water is withdrawn. It does not necessarily make sense for a business (especially a small business) to perform a baseline study when it has installed highly protective technologies such as closed-cylce cooling and is located on a large body of water (i.e. Mississippi River).

EPA Response

See Response to Comment 316bNFR.536.014.

Comment ID 316bNFR.035.013

Subject Matter Code	MISC
	Miscellaneous Comment

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

New CWIS Established For Cogeneration Purposes Should Not Be Subject To Rigid Requirements As New Sources.

A cogeneration unit is energy-efficient because the thermal energy used to produce electricity is also used for another process. In many cases, this involves a fossil-fuel-fired boiler or combined-cycle gas turbine, in which steam generated in the boiler, or in a heat recovery steam generator after a gas turbine, is first used to drive a turbine generator and subsequently is used for process steam requirements at an industrial facility (the "steam host").

There may be numerous other interconnections between the cogeneration unit and the steam host: boiler feedwater may be supplied by the steam host, and condensed steam from the industrial process may be returned to the cogeneration unit, for example. Boiler shell or turbine cooling water, or cooling water used to condense steam may then be used as process water for the steam host. The cogeneration unit may be owned by the steam host or, just as frequently, may be owned by a third party that enters into a contractual agreement with the steam host (which may include leasing the property for the cogeneration unit from the steam host).

Since a cogeneration unit must be located close to an industrial facility, section 316(b) requirements for the location of new cooling water intake structures and limiting them to a certain percentage of stream flow, for example, could effectively prevent the use of cogeneration at a particular existing industrial or agricultural facility. Meeting a required minimum cooling water recirculation rate may be impossible or at least undesirable for a cogeneration unit, where cooling water from the cogeneration unit may subsequently be reused as process water by the steam host (for improved energy efficiency) and then treated and discharged.

Because a cogeneration unit may be considered to be engaged in a different type of activity (electricity generation) than the steam host it is associated with, the cogeneration unit might be considered a "new source" under 40 CFR § l22.29(b)(1). The Council recommends that EPA explicitly provide that it may not be appropriate to subject new cogeneration units located at existing facilities to the rigid section 316(b) standards EPA has proposed for new sources. EPA needs to build sufficient flexibility into the new source standards to accommodate the special issues that cogeneration units present.

Therefore, we believe that EPA should not construct the rule in such a way that would discourage cogeneration but rather encourage this energy-efficient practice.

EPA Response

EPA disagrees that cogeneration plants, in general, should not be subject to the requirements of a new facility under the § 125.84. Please see response to comment 316bNFR.012.013.

Comment ID 316bNFR.035.014

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Adverse Environmental Impact Should Address Impacts On Populations Not Individuals.

The Council believes that the definition of "adverse environmental impact" (AEI) is critical in terms of this rule as well as the forthcoming proposal on existing cooling water intake structures. Since the Utility industry and EPRI have substantial long-term experience with 316(b) issues in general, and specifically on an improved definition of AEI, the Council strongly encourages EPA to fully consider the Utility Water Act Group's (UWAG) comments on this topic. We fully endorse the concept of determining fish and aquatic health and vitality based upon fish population - rather than on the possible arbitrary determination of AEI with the impingement or entrainment of one fish.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.035.015

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

We agree with the utility industry that AEI must be defined more clearly since the statute requires minimization of AEI. If the EPA does not clearly define AEI, a company will never know if it has met its requirements. Certainty as to what is AEI is fundamental to the future success of the 3l6(b) program. It is also essential that state permit writers have a clear understanding of AEI. Beginning on page 49074 of the preamble, EPA begins a discussion of what an adverse environmental impact is under this rule and presents at least four alternatives for comment. In all cases, EPA seems to require that all populations of aquatic organisms be protected. EPA's third alternative, for instance, points to language used by the state of New York requiring that no organisms be entrained. One of the reasons New York gives for this stringent requirement is that such taking "might increase nuisance species" (page 49074 and 49075 of the preamble). This is an overly simplistic view of the potential impacts of entrainment and impingement. At some sites, the organisms impinged will be primarily nuisance species, introduced species or species that frequently have large die-offs due to other causes. Populations of carp, gizzard shad, zebra mussels, Corbicula (asiatic clam) and others would fit into this category. The idea that taking any or even 1% of these organisms from the population is harmful does not appear to be consistent with the intention of the 3l6(b) provisions of the Clean Water Act. Instead, this indicates a need for a more-site-specific approach with sensible and clear methods to identify the populations or community to be protected.

EPA Response

Please see response to comment 316bNFR.029.013.

EPA agrees that permit writers should have a clear understanding of what is meant by AEI and how it can be measured accurately. Detailed information describing how AEI can be assessed and measured will be provided in forthcoming guidance.

EPA's interpretation of AEI is discussed in section VI.B.2.a of the preamble. Protection of nuisance species is not included in today's interpretation of AEI.

Comment ID 316bNFR.035.016

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

On page 49075 of the preamble, EPA asks for comments on whether to apply a standard of adverse impact similar to 316(a). This should be encouraged since this approach would be less confusing to regulators and the regulated alike. More importantly, however, the 316(a) approach is preferred because it focuses on the maintenance of balanced indigenous populations of fish, shellfish, and wildlife rather than on individual organisms.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.008, and the preamble to the final rule.

Comment ID 316bNFR.035.017

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

For structures that exceed the 25 MGD threshold under the New Facility proposed rule, the Council supports a tiered approach to assessment and remediation. The initial tier should involve studies to determine best decisions on location and design requirements as a function of the impact found. The tiered approach for assessment and remediation requires a clearer definition of AEI for this system to work.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. EPA has discussed and clarified AEI in the preamble to the final rule.

Comment ID 316bNFR.035.018

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 7.4

Water Withdrawal threshold

The American Chemistry Council strongly supports a threshold approach for the application of the 316 (b) standards for new facilities as well as cooling water intake structures at existing facilities. Based on information contained in the docket for this rulemaking, the Agency has the option of choosing an applicability threshold of much more than 2 mgd and would still be able to capture the vast majority of cooling water. Moreover, we strongly urge EPA to revise its current threshold level of 2 mgd and instead adopt a more reasonable threshold as suggested elsewhere in these comments.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.035.019

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 7.1

Definition: New Facility

The Council maintains that EPA must clearly define the applicability of the proposed rule, so that it only covers a "greenfield" plant or a new, substantially independent plant co-located with an existing plant and requiring a new or expanded intake structure. EPA should make clear that the "substantially independent" test is based on whether the facility owner could practicably locate the facility elsewhere, since EPA has based the proposed new facility requirements on the assumption that the owner has the option of choosing the location for the facility to allow him to comply with the intake structure location and operation requirements. Also, EPA should specifically recognize that a cogeneration plant would not be considered substantially independent from the industrial facility to which it provides thermal energy, and therefore would not be considered a "new facility" unless it was constructed at a greenfield site.

EPA Response

See responses to 316bNFR.030.003 and 012.011.

Comment ID 316bNFR.035.020

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 5.2

Existing Facilities/Facilities Under Construction

We strongly recommend that EPA substitute "actual intake flow" for "design intake flow" in the proposed regulatory language for existing structures and should also include a definition of this term.

EPA Response

Today's rule applies to new facilities as defined in section 125.83 and further explained in the preamble. The commenter will have the opportunity to review and submit comments regarding the existing facilities rule when it is published pursuant to the consent decree. See preamble to today's rule.

Comment ID 316bNFR.035.021

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

The American Chemistry Council suggests that the Agency use a "major" use standard to determine if an intake in question is a cooling water intake structure.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.035.022

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Joe Mayhew & Tony Wagner

Organization American Chemistry Council

We fully endorse the concept of determining fish and aquatic health and vitality based upon fish population - rather than on the possible arbitrary determination of AEI with the impingement or entrainment of one fish.

EPA Response

Please see response to comment 316bNFR.507.004.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Gary R. Fuhrman

On Behalf Of:

Constellation Energy Group

Author ID Number:

316bNFR.036

Note

Fully supports the comments made by UWAG (316bNFR.068), EPRI (316bNFR.056), EEI (316bNFR.069), and EPSA (316bNFR.041)

Comment ID 316bNFR.036.001

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

We strongly support UWAG's position that EPA should abandon the technology-based approach that sets uniform national standards and also requires extensive site-specific study and monitoring. Instead, as detailed in the UWAG comments, EPA should adopt a consistent two track process that continues the long standing practice of applying Section 316(b) requirements on a site-specific basis but also includes a "fast track" process. The fast track process is particularly important to us because Constellation is facing increasingly tight schedules for developing new generating facilities and any added delays from new regulations could have serious adverse consequences for our business and could intensify regional electricity supply problems.

Under this streamlined approach, instead of requiring a full site-specific assessment in every case, permittees should have the option of seeking an expedited Section 316 (b) determination for new facilities. This track would not require pre-operational site-specific biological, technical and cost studies, because the permittee would offer to include technologies or characteristics that are highly protective (in most cases overprotective) of aquatic resources.

Constellation suggests that for new facilities such technologies could consist of wet cooling towers, intake velocity of 1 fps (0.5 fps if sensitive species<FN 1> are present) and, on appropriate water bodies, fine mesh screens. Waterbodies where fine mesh screens would not be appropriate would include estuaries/tidal rivers and other systems where surface fouling would make such screens infeasible. Agreeing to install such technologies should remove the need for a particular facility to conduct extensive pre-operational biological studies (any on-going biological monitoring requirements would be minimized); they should not have to consider additional intake system technologies to further reduce Impingement/Entrainment, and they should not be required to further minimize makeup water or blowdown.

Equally acceptable would be the site-specific determination of best technology available (ETA) for minimizing adverse environmental impact (AEI) detailed by UWAG. This track would include, when necessary, extensive biological monitoring or use of existing data to assess whether there is a risk that AEI could be caused by the new facility.

Footnotes

1 Based on studies of laboratory derived swim speeds, Coutant recommends I fps as a protective screening criterion or 0.5 fps if certain species with decreased swimming ability may be present. "Technical Evaluation of the Utility of Intake Approach Velocity As An Indicator of Potential Adverse Environmental Impact Under 316(b)" Coutant et.al. Draft September 2000, Environmental Sciences Division. ORNL.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities

with the goal of also allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays.

Under Track I a facility would be required to submit minimal existing information to be provided to the permitting authority. Additional information would be required under Track II to demonstrate that a facility's proposed technology suite would meet the requirements of Section 125.84.

Under this approach new facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

Comment ID 316bNFR.036.002

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

Subject Matter Code 9.44

Request for Comment: Definition of AEI

AEI cannot mean harm to a single fish or a single egg; it must mean harm at the population or community level. If there is a risk of AEI, then costs of installing additional cooling water intake system technologies would be balanced with the expected environmental benefit.

EPA Response

Please see response to comment 316bNFR.507.004 and the preamble to the final rule for additional discussion of the issues raised in this comment.

EPA finds the argument that cooling water intake structures harm one fish or a single egg specious. The record shows that without controls, cooling water intake structures harm thousands to millions of fish and shellfish and billions of larvae.

Comment ID 316bNFR.036.003

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

EPA's final 316 (b) rule should only apply to point sources that own or operate their own cooling water intake structures.

EPA Response

EPA disagrees for the reasons stated in the preamble and elsewhere in these responses to comments. Section 125.81(b) of today's rule provides that a new facility is subject to the rule if it obtains cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States. The reason for this provision, as stated in section 125.81(b) itself, is to prevent the circumvention of the rule by creating arrangements to receive cooling water from an entity that is not itself a point source.

Comment ID 316bNFR.036.004

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA's regulations should not require the use of dry cooling. The additional expense for this technology above the cost of wet towers is not justified. There are examples where this technology is being used but it should be at the option of the permittee and not part of any new uniform requirements.

EPA Response

EPA agrees with the commenter. See Section V.C of the preamble to the final rule.

Comment ID 316bNFR.036.005

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

Subject Matter Code 7.1

Definition: New Facility

EPA must ensure that the rule truly applies to new sources and new cooling water intake structures only. The economics involved with siting true greenfield facilities as compared to modifying or repowering existing facilities are fundamentally different. Changes to existing facilities that use an existing intake or that use a modified existing intake should not be covered by the new source rule.

EPA Response

Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule. Thus, the rule allows for numerous types of changes to existing facilities, while defining new facilities in a manner consistent with existing NPDES definitions addressing new sources and new dischargers.

Comment ID 316bNFR.036.006

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

EPA's decision to use the littoral zone as an indicator of biological sensitivity is flawed. The term is poorly defined. The areas included would change over time. Further it is improper to define all areas in tidal rivers and estuaries as "most sensitive." This is overly broad. It is well established that some areas of estuaries are much more productive than others (eg. regions of low dissolved oxygen are associated with low biological productivity).

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.036.007

Subject Matter Code 20.3

Head Loss Monitoring

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

EPA should not require regular monitoring of screens for clogging and head loss. This would be unnecessarily burdensome as a requirement and in some conditions could become infeasible. From time to time plants in estuaries experience blooms of hydroids (grass-like colonial animals). Plants typically monitor operational parameters and adjust maintenance activities to deal with these conditions as needed. However, a uniform requirement based on a particular velocity / headloss criterion during these blooms could be difficult or impossible to attain. Further, such blooms tend to occur in summer coinciding with periods of peak energy use and new restrictions could make it hard for us to meet customer demands.

EPA Response

EPA is requiring head loss monitoring to show that each facility is operating and maintaining the cooling water intake structure so as to continue to maintain the intake velocity at a level close to the design intake velocity (0.5 ft/s in Track I) after the plant is up and running. EPA concluded that this is the most appropriate and least burdensome way to demonstrate compliance with the design intake velocity because head loss is easily established by a simple measurement of the height of the water both in front of and behind the screen. Increased head loss indicates that the flow through the screen has been reduced with a resulting increase in velocity through the screen. An increase in head loss is typically caused either by clogging or other debris problems. Increased velocity increases the potential for damage to aquatic organisms through entrapment and impingement. Maintaining a relatively consistent velocity as shown through head loss measurements demonstrates that the facility is maintaining an appropriate cleaning and maintenance schedule. Since head loss is being used as a surrogate for velocity, the facility would need to evaluate how the head loss changes in relation to the velocity. Once that relationship is established, the facility can use headloss as an indicator as to when the screens require cleaning or when they should be rotated more frequently. We recognize that there is variability in velocity that may occur due to site-specific conditions and debris loading at cooling water intake structures. However, it is expected that the permit writer will take into account particular seasonal or unusual occurrences in the manner in which monitoring should be conducted and the timing. The requirement is intended to demonstrate that the design standard is being maintained.

Comment ID 316bNFR.036.008

Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

Author Name Gary R. Fuhrman

Organization Constellation Energy Group

EPA 's intake flow limit for estuaries based on 1% of a certain tidal volume (65 Fed. Reg. 49,086) is unworkable. In particular, the dimension based on "one tidal excursion" is overly simplistic. It fails to account for density driven circulation which results in two-layer flows in most estuaries and a three layer flow pattern in Baltimore Harbor. Stroup et.al. (Final Report Baltimore Harbor Study, Tech Rept # 26, CBI) state that the three-layer circulation pattern (net inflow surface and bottom, net outflow middle [3-8m] layer) is the primary factor in establishing the net flushing rate for Baltimore Harbor. It is not clear how EPA would expect "ebb tidal excursion" to be determined in such a situation and we recommend EPA dispense with the concept for estuaries.

EPA Response

On the basis of the supporting data presented in the proposed rule and the NODA, Track I and Track II of today's final rule maintain the proposed flow limitations for estuaries and tidal rivers. See response to comment316bNFR.025.003.

With respect to the commenter's issue with the tidal excursion method, other more complex methods are available for determining the volume of water passing by a facility and the percentage withdrawn. Facilities are free to use more complex modeling approaches if so desired. However, EPA believes, based on review of available methods, that the tidal excursion method is the most simple and accurate model available. Other methods reviewed were more time and labor intensive but did not produce better results.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kevin T. Herbinson

On Behalf Of:

Southern California Edison

Author ID Number:

316bNFR.037

Comment ID 316bNFR.037.001

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Kevin T. Herbinson

Organization Southern California Edison

We strongly object to EPA's unjustified use of the San Onofre Nuclear Generating Station (SONGS) as an example of unacceptable § 316(b) impacts (65 Federal Register 49,073). The SONGS example is contrary to prior EPA and California Regional Water Quality Control Board findings. EPA, through its expert contractors, has thoroughly studied the SONGS intake structure and found it not only incorporates best technology available (BTA), but in fact complies with the § 316(b) purpose of minimizing adverse environmental impacts. EPA also attributes impacts on kelp beds, and fish associated with kelp beds, to operation of the intakes at San Onofre Nuclear Generating Station (SONGS) when, in fact, these effects were never attributed to entrainment and impingement by the studies cited. Rather, the effects were attributed to turbidity from the discharge. In addition, the studies on which EPA is relying are outdated and ignore an extensive body of more recent scientific analysis of the facility's impact on the kelp beds. More recent studies show that if any impact is present, the reduction in kelp beds attributable to discharge characteristics is far less than originally believed. This conclusion was affirmed by an independent scientific review panel approved by the state of California. Indeed, EPA itself has agreed that the SONGS intake is BTA, based upon its contractor's conclusion that:

The cooling water systems of Units 2 and 3 at SONGS employ a number of technologies to reduce effects to aquatic biota. Specifically, intake structures for cooling water incorporate velocity caps, which are designed to promote movements of organisms with sufficient mobility away from the intake ports. Furthermore, Units 2 and 3 include a Fish Return System (FRS) which is designed to return fish entrained in intake waters to offshore areas in a viable condition. Separate studies by SCE and the MRC note the effectiveness of the FRS, although the efficiency varies among species and with the size and mobility of specific organisms.

The area in the vicinity of the intake and discharges from SONGS contain populations or communities of organisms, including shellfish and fish, that remain viable and capable of self -propagation. These populations or communities are characterized by diversity, the capacity to sustain themselves through cyclic changes, the presence of necessary food chain species, and an apparent lack of domination by pollutant tolerant species.<FN 2>

SCE has continued to reduce environmental impacts at SONGS, and assure BTA, by investigating light and sonic devices and other methods to reduce fish impingement losses, and is undertaking programs to offset alleged fish losses through wetlands restoration and kelp reef construction. EPA cannot justifiably point to SONGS as an example of unacceptable § 3l6(b) impacts given the efforts made at SONGS to achieve and maintain BTA and EPA ' s own study affirming the success of these efforts. Consequently, SCE respectfully requests that EPA retract these inaccurate assertions.

Footnotes

1 Dean, T.A., and L. E. Deysher, 1995. Reevaluation of the SONGS Related Losses of Kelp at San Onofre. Report to Southern California Edison Co. Coastal Resources Associates, Inc.

2 Review of Southern California Edison San Onofre Generating Station (SONGS) 316(b) Demonstration -Final, June 22, 1994, prepared for U.S. EPA by SAIC, p. 4-1.

EPA Response

EPA acknowledges that much of the turbidity in the vicinity of SONGS is related to the effects of the discharge rather than the intake and that this is one of the significant factors affecting the reduction of the kelp beds. The Agency does not agree that the turbidity alone is the factor responsible for the impacts documented to be occurring at SONGS. EPA is aware that a determination was made that the SONGS intake was best technology available. However, that determination was based in large part on EPA's 1977 316(b) guidance, not on today's rule which applies only to new facilities. Further, EPA disagrees with the commenter that the Agency relied upon outdated information or ignored more recent data. EPA maintains that the Agency relied upon the best data available for the proposed and final rule. In most cases updated information was not available, however, to the extent possible, EPA has supplemented the facility information in the record for this final rule to include updated information. EPA would also note that some of the data used by Southern California Edison in support of their position dates back to the 1980's and early 1990's.

EPA also takes issue with the commenter's position that the SONGS facility is not having an adverse impact on the aquatic biota in the vicinity of the plant. Rather, EPA maintains that this claim is a matter of dispute. As stated in the 1993 316(b) draft demonstration report, "operations at SONGS do appear to have resulted in certain impacts to selected populations or communities. In addition to the impacts to juvenile forms of fish that are entrained into the plant, biological communities that are part of or dependent on the San Onofre kelp bed are estimated to be adversely impacted, though the degree and extent of this impact remains a subject of contention."1

EPA acknowledges that historical data from selected facilities may not reflect current impingement and entrainment rates at certain facilities, particularly if technologies and other operational measures for reducing impingement and entrainment rates at the facility have been implemented since the original study. Nevertheless, EPA asserts that the examples of environmental impact provided in the proposed rule are illustrative of the types of effects associated with cooling water intake structures. Finally, EPA would note that today's rule applies only to new facilities, not existing, and the concerns raised by the commenter apply to an existing facility.

1. Review of Southern California Edison San Onofre Generating Station (SONGS) 316(b) Demonstration – Draft, July 26, 1993, prepared for U.S. EPA by SAIC, p 4-1.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Mark V. Carney

On Behalf Of:

PG&E National Energy Group

Author ID Number:

316bNFR.038

Comment ID 316bNFR.038.001

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Mark V. Carney

Organization PG&E National Energy Group

We are concerned that, in developing the proposed rules, EPA is relying on erroneous information, or misinterpreting existing information, concerning the Bray ton Point Generating Station, which PG&E NEG acquired in September 1998. Therefore, we have provided information on the Brayton Point Generating Station and ask EPA to correct the record as described below, and to consider our recommendations for amending its proposal accordingly.

EPA Response

EPA disagrees with the commenter that it is relying on erroneous information or misinterpreting existing information concerning the Brayton Point facility. EPA relied on the best information available. Please see Response to Comment numbers 316b.NFR.056.005, 068.050, 038.011, and sections III and VI.B of the Preamble for additional discussion of these issues.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.038.002

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Mark V. Carney

Organization PG&E National Energy Group

Section 316(b) cannot be implemented unless there is a definition of "adverse environmental impact" (AEI). Without a definition of AEI, EPA cannot justify imposing technology requirements.

EPA Response

Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.038.003

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Mark V. Carney

Organization PG&E National Energy Group

The definition of AEI cannot mean harm to a single egg or organism; it must mean harm at the population or habitat level. EPA must recognize that some losses of fish are not harmful to the fishery resource as a whole and there is no reason to view losses caused by Cooling Water Intake Structures (CWISs) as fundamentally different from losses by any other human activity. We support the following definition of AEI that reflects elements proposed by UWAG and EPSA:

Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, (2) is attributable to the operation of the cooling water intake structure, and (3) is balanced against other non-aquatic environmental impacts.

EPA Response

Please see responses to comments 316bNFR.069.008, 316bNFR.036.002, and the preamble to the final rule for additional discussion of the issues raised in this comment.

Comment ID 316bNFR.038.004

Author Name Mark V. Carney

Organization PG&E National Energy Group

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

The new rules should provide for a site-specific assessment of individual sites where CWISs will be placed. Such a site-specific assessment need not be the exclusive means of making a § 316(b) decision, but it should be one option available to the permittee (In fact, a more "categorical" option is presented below. With the "streamline" option, the permittee could elect to employ conservative technologies in order to reduce the lengthy pre-operational monitoring). A site-specific assessment would not necessarily involve the same time and level of effort at every site, though. A screening approach could be used to quickly identify sites and CWIS designs that presented no appreciable risk of AEI.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

Comment ID 316bNFR.038.005

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Mark V. Carney

Organization PG&E National Energy Group

EPA appears to have chosen the littoral zone to represent sensitive biological areas because it believes this choice makes the rule simple and relatively easy to apply. But the simplification does not recognize the many biological, hydrological, and physical features of a site that should be considered when designing a CWIS.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.038.006

Subject Matter Code 19.2

Baseline Biological Characterization Study

Author Name Mark V. Carney

Organization PG&E National Energy Group

For many major waterbodies on which electric generating stations are already sited, qualitative information on aquatic species should already be available. At such sites, little additional information would be provided by an additional year of sampling in the vicinity of a proposed CWIS. The new facility rule should acknowledge that further data collection would typically not be necessary where significant studies are already underway or complete. At a minimum, the rule should clarify the conditions under which existing data can be used.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.038.007

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Mark V. Carney

Organization PG&E National Energy Group

We support restoration measures as a strategy for avoiding or addressing aquatic impacts, as they may be the most appropriate and effective approach in some cases. However, given the site-specific nature of this approach, restoration should only be used in cases where site-specific alternatives to strict technology requirements are sought by the applicant.

EPA Response

See response to comment 316bNFR.024.007

Comment ID 316bNFR.038.008

Subject Matter Code EXIST

Existing Facility Rule

Author Name Mark V. Carney

Organization PG&E National Energy Group

Decisions made in this rulemaking for new facilities should not be allowed to prejudice decisions yet to be made in the rulemaking for existing facilities. Much different considerations govern existing facilities, and the rule for new facilities should not be taken as "precedent."

EPA Response

See response to comment 316bNFR.007.001.

Comment ID 316bNFR.038.009

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Mark V. Carney

Organization PG&E National Energy Group

The proposed regulations require new sources to develop a Baseline Biological Characterization (BBC) of the waterbody where the new CWIS will be located. The time required for this characterization, preparation of sampling plans, and the completion of permit applications will require the permittee of a new facility to begin these activities a minimum of 635 days prior to the commencement of operations. In addition, it is unlikely the project developer for a new facility will be able to obtain financing until these studies are complete. Such impacts would be detrimental to efforts to develop plants in a timely manner- at a time when many areas of the country are already facing immediate needs for additional energy.

To overcome this impediment to the siting of new facilities, EPA must allow the permittee alternatives that will help "streamline" the siting/permitting process. One such alternative would be for EPA to allow the permittee the option of selecting a preapproved technology solution sufficiently conservative to protect the environment at most sites regardless of local conditions. This option would not require pre-operational site-specific biological, technical, and cost studies, because the permittee would offer to include in its facility and/or CWIS design technologies or characteristics that are highly protective (in most cases overprotective) of aquatic resources.

Another possible option would be for EPA to develop a screening approach that could be used to identify new facilities that will create little or no potential for AEI. Such facilities should be allowed to avoid extensive data collection and analysis.

To reiterate, the new rules should provide for a site-specific assessment of individual sites where CWISs will be placed. However, for sites where AEI are minimized, there should be alternatives, based on clearly identified criteria, for streamlining the application and approval process. The options presented below are presented as alternatives to the site-specific approach in order to allow timely development of new facilities:

Streamline Option

This option should be available to the permittee, especially in the situation where the CWIS is to be located outside of the littoral zone established for that particular section of the waterbody.

For new facilities that choose to install highly protective technologies, such as wet recirculating cooling towers (and perhaps other low-flow or low velocity options), the need to conduct a baseline biological characterization is unnecessary. EPA acknowledges that wet recirculating cooling towers greatly reduce (by 72-98 percent) water flow in comparison to once-through systems. (65 Fed. Reg. 49,103 col. 3). Therefore, any new facility electing to install cooling towers should not be required to perform pre-operational monitoring.

Screening Criteria Option

EPA should develop a screening approach to identify new facilities that would have little or no potential to affect the sustainability of fish populations. Key characteristics that can be used to screen out facilities that will create little or no potential for AEI include:

* The location of the proposed intake relative to important aquatic habitats,

* The fraction of the flow or volume of the waterbody that will be withdrawn each day,

* The design of the facility, and

* The life histories of relatively important (i.e. indicator species) or potentially vulnerable species.

Conservative screening criteria can be established using these characteristics that would distinguish between intakes that might cause adverse impacts and should be analyzed further and those that are unlikely to cause AEI. This alternative could be used," at the permit applicant's option, to avoid unnecessarily extensive data collection and analyses.

EPA Response

See Response to Comment 316bNFR.536.014.

Comment ID 316bNFR.038.010

Subject Matter Code	7.1

Definition: New Facility

Author Name Mark V. Carney

Organization PG&E National Energy Group

The proposed rule applies to a "new source" or "new discharger" as defined in 40 C.F .R. § 122.2 and § 122.29(b)(I), (2), and (4). (65 Fed. Reg. 49,116 col.3). Section 122.29 includes criteria for new source determinations that cover any source (1) which "totally replaces the process or production equipment that causes the discharge of pollutants at an existing source, or (2) has processes "substantially independent of an existing source at the same site." (40 C.F.R. 122.29(b)(1)(2).

However, in the preamble of the proposed rule, EPA indicates that its intention is to cover only new "greenfield" or stand-alone facilities, although those facilities could be tied into modified intake structures. (65 Fed. Reg. 49,066 col). 1. EPA suggests that it does not intend to cover modifications to existing facilities, even if the CWIS also is modified. But it is not clear, given the cross-reference to existing definitions of "new source" and "new discharge", that EPA has achieved its objective. In fact, it is possible that the above criteria could be interpreted to cover significant modifications or expansions of existing facilities. EPA must better define "new facility" (perhaps by eliminating the cross-reference to existing definitions of "new source" and "new discharger") and clarify the types of facilities to which the proposed regulations apply to ensure that the regulations are not interpreted to apply to such modifications or expansions of existing facilities.

EPA Response

See response to comment 316bNFR.030.003.

In the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, or those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule. Thus, the rule allows for numerous types of changes to existing facilities, while defining new facilities in a manner consistent with existing NPDES definitions addressing new sources and new dischargers.

Comment ID 316bNFR.038.011

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Mark V. Carney

Organization PG&E National Energy Group

In the preamble to the proposed rules, EPA attempts to show the need for this rule by describing significant adverse environmental impacts that it says are occurring as a result of cooling water intake structures at several power plants. One of those is the Bray ton Point Station located on Mt. Hope Bay in Somerset, Massachusetts. The Company strongly objects to the use of Brayton Point Station and Mt. Hope Bay data to support EPA's claim that significant fishery impacts are occurring as a result of cooling water intake structures ("CWIS"). For the reasons discussed below, we believe that the data and analyses developed to date do not support a conclusion that the Brayton Point CWIS, and particularly that portion associated with Unit No.4, is having an adverse environmental impact on Mt. Hope Bay.

Unit No.4 at Brayton Point began operation in 1974 with a closed-loop, salt-water evaporative cooling system that was subsequently converted to the use of fresh water because of objectionable salt drift. In July 1984, the Unit was switched to once-through cooling when local communities were no longer able to supply the necessary fresh makeup water.

The conversion to open-cycle cooling included installation of a state-of-the-art angled screen intake system, which underwent thorough agency § 316(b) review. In addition, the Unit No.4 intake was designed with a cooling velocity of 0.5 fps through the bar racks. The combination of low approach velocity and angled screen alignment are effective in minimizing potential impingement impacts of the CWIS on smaller aquatic organisms. Because of these characteristics of the CWIS, most fish entering the intake area are "guided" into a fish bypass system, which returns them to the Bay at some distance from the intake. Those organisms that become impinged on the screens are washed off with a low-pressure spray and directed into the fish bypass system.

To minimize entrainment, Unit No.4 has the capability of "piggybacking" on top of the cooling system for Unit No.1, 2 and 3 in the winter (i.e., a portion of Unit No. 1,2 and 3 cooling water discharge is used as the cooling water intake for Unit No.4), thereby closing its intake during the critical winter flounder spawning season.

Apparently, EPA's principal basis for suggesting that Brayton Point Station may be causing an adverse impact apparently is a report entitled Comparison of Trends in Fish Assemblages of Mt. Hope Bay and Narragansett Bay in Relation to Operations of the New England Power Brayton Point Station ("RIDF&W Report"). This report was prepared by Dr. Mark Gibson of the Rhode Island Division of Fish and Wildlife ("RIDF&W"). We believe that EPA has taken sections of that report out of context. The RIDF&W Report performs a statistical analysis on three coastal trawl data sets, one from Mt. Hope Bay (MRI MHB), and two from Narragansett Bay, (RIDFW NB and URIGSO NB). The analysis indicates that the aggregate resource abundance, as defined by trawl data, has declined in Mt. Hope Bay while remaining stable in adjacent Narragansett Bay (RIDF&W Report, Figure 1). Importantly, the RIDF&W Report does not attempt to demonstrate linkage of fish population declines in Mt. Hope Bay with open-cycle operation of Unit No.4. Further, the RIDF&W also concluded that commercial and recreational fishing pressure on winter flounder stocks has been above sustainable

levels for a number of years ("Flounder disappearing from Bay", Providence Journal-Bulletin, March 16, 1998, see. Attachment 1).

While PG&E NEG has already provided feedback on the RIDF&W Report, we wish to reiterate that the author was careful to say that "[l]acking an experimental approach, it is not possible to demonstrate linkage with [Brayton Point Power Plant]" (RIDF&W Report at p. 11), much less that any of the trends observed in Mt. Hope Bay were attributable to entrainment or impingement at the facility. Indeed, while the RIDF&W Report speculates that reductions in finfish abundance may be attributable to elevated temperatures and/or reduced oxygen levels (p. 11), an analysis performed by Lawler, Matusky, and Skelly Engineers shows that the downward abundance trend also correlates with a substantial increase in fishing pressure. (Refer to Figure 4 and 5 of the November 27, 19961etter from A.H. Aitken, New England Power, to W. L. Bridges, Massachusetts Division of Marine Fisheries, see Attachment 2).

Moreover, while “there may well be substantial differences in the two bays in terms of total resource abundance, individual species data present a different picture. As the Company documented in its analysis of the RIDF&W Report, important species such as tautog, windowpane, and winter flounder, which historically have dominated the Mt. Hope Bay trawl data, have experienced similar declines regionally. The attached Figures 1 through 9 (See Attachment 3) illustrate the similarities between the abundance of winter flounder, windowpane and tautog populations over the same time series used to generate Figure 1 in the RIDF&W Report. Furthermore, from this more focused view of the underlying data, it is clear that declines in these species do not correlate well with the Unit No.4 open-cycle operation. The apparently stable aggregate abundance in Narragansett Bay may be attributable to large population increases in other species, such as squid, which have never been found in abundance in Mt. Hope Bay.

Differences in measurements of key species populations also may be attributable in part to differences in sampling methodologies. Beginning in 1996, the Mt. Hope Bay standard trawl program was modified to make it consistent with the RIDF&W program, so that data would be more comparable. Results of the sampling with the modified trawl program (Wilcox trawl) suggest trends in aggregated resource abundance different from those observed with the Standard trawl. (Refer to Figure 10, attached, which is an updated Figure 1 from the RIDF&W Report, see Attachment 3). The data collected with the Wilcox trawl show higher numbers caught per tow than in the Standard trawl because the finer mesh retains more of the smaller, more abundant pelagic species like bay anchovy. In addition, the Wilcox trawl results show a small increasing trend during the 1996 through 1999 time series while the standard trawl catches are stable during the same period. While neither of these trends is statistically significant, they suggest that the author's conclusions in the RIDF&W Report regarding relative stability of the aggregated resource abundance in Narragansett and Mt. Hope Bays may have been biased by the fact that the trends from years with different size cod end meshes were compared. (Figures 1 through 10 in Attachment 3 are taken from the Brayton Point 1998 Annual Biological and Hydrological Report issued to EPA on December 17, 1999 and updated to include the 1999 data.)

The entrainment calculations for winter flounder, windowpane and tautog included in Part A of the Supporting Statement to the ICR are actually annual averages through a time series (1973 - 1985 for windowpane and tautog and 1973 -1985; 1992- .1994 for winter flounder) not entrainment estimates

for 1994 as stated in the Supporting Statement of the ICR. Estimates of winter flounder entrainment can be found in the above-referenced annual Brayton Point report. The annual report identifies the number of winter flounder larvae entrained in 1994 as 0.09 billion and estimates the adult equivalent mortality of winter flounder from entrainment losses at 3,467 pounds (unstaged) and 18,382 (staged), a small fraction of the average 96,507 pounds per year calculated with the entire time series data. During this period in 1994, Unit No.4 operated in the piggyback mode so that no entrainment from that unit occurred. Furthermore, these values probably overstate the actual impact, because it assumes 100% mortality of entrained organisms. Recent studies at Brayton Point Station show that some species survive passage through the cooling system in significant numbers. Winter flounder, windowpane and Atlantic silverside survival, for example, were 90%, 65% and 95% during the 1997-1998 Entrainment Study.

The above comments reflect PG&E NEG's strong belief that it is inappropriate to rely on any "conclusions" about Brayton Point Station and Mt. Hope Bay in support of the revised ICR. The RIDF&W Report presents an important hypothesis which deserves serious inquiry. In response to a § 308 data request from EPA Region 1, we currently have underway a comprehensive study plan to clarify the impact of the Brayton Point Station on the ecology of Mt. Hope Bay. This includes site-specific thermal plume modeling, critical temperature analysis for representative and important species, fish population modeling, and intake technology review. Until this extensive study program is complete, we recommend that EPA's response to comments clarify that more site-specific study is required before any conclusions can be drawn about whether the Brayton Point Unit No.4 has caused or is likely to cause any adverse environmental impact in Mt. Hope Bay.

EPA Response

EPA has considered the commenters objections. The commenter appears to mistakenly assume that EPA believes that the Brayton Point facility is the sole cause for the decline of winter flounder in Mt. Hope Bay. Rather, EPA recognizes that there are multiple stressors and factors likely responsible for this phenomenon and further recognizes that increased fishing pressure may be one of the contributing factors. The Agency believes that impingement and entrainment mortality associated with the operation of the Brayton Point facility is one of the contributing factors in the decline of fish abundance in and around Mt. Hope Bay. The Agency continues to maintain that the winter flounder in Mt. Hope Bay are subject to substantial entrainment at the Brayton Point facility, and the population has experienced a dramatic decline over the past 15 years. Even though fishing restrictions have been imposed, the population has failed to recover. Given the documented decline in many fishery stocks and the admitted uncertainty associated with managing fish populations, EPA believes that a precautionary approach is warranted. This is especially appropriate in that the Agency has extensive data documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes.

EPA disagrees with the commenters use of the term significant adverse environmental impact. See the preamble to the final rule. Also, today's rule applies only to new facilities, not existing ones such as Brayton Point. A future rule making will address facilities such a Brayton Point.

For additional discussion of issues raised in this comment please see Response to Comment

316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Robert S. Kripowicz

On Behalf Of:

U.S. Dept. of Energy

Author ID Number:

316bNFR.039

Note

Comments included several tables and figures. These items were not scanned and are included together as an Attachment.

Comment ID 316bNFR.039.001

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

DOE still supports the tree-tiered framework as providing the flexibility to impose strict requirements where intakes created adverse environmental impact (AEI) but minimal requirements where intake operators could demonstrate that intakes did not create AEI. The new proposed rule includes as its favored option an approach that is based almost entirely on the general physical location of the intake structure without considering many site-specific engineering, physical, or biological factors. The proposed approach does not allow for careful consideration of site-specific factors or seasonal variation in risk. We believe that national 3l6(b) regulations should provide a framework for States to follow but not impose such strict guidelines and parameters that States have little flexibility to exercise judgement. Therefore, we continue to support the formal inclusion of the rebuttable presumption option to allow permittees to argue for more site-specific considerations.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. EPA did not adopt the three-tiered framework offered by industry, but did incorporate aspects of that approach, including flexibility under Track II to consider site-specific factors. All cooling water intake flow results in the potential for impingement and entrainment. For this reason, EPA did not adopt an approach in the final rule that focuses primarily on assessing whether AEI is occurring. Rather, the rule establishes technology-based performance requirements and offers new facilities the option of meeting the required levels of performance through the use of those technologies that most effectively reduce harmful environmental impacts at their site. Regarding use of the rebuttable presumption option, see response to comment 316bNFR.009.004.

Comment ID 316bNFR.039.002

Subject Matter Code EXIST

Existing Facility Rule

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Although EPA indicates that these proposed regulations are intended to apply solely to new sources, we are quite concerned that, once these are published, they may be considered as the starting point for EPA's upcoming existing-source regulations. We acknowledge that new sources have a much greater ability to economically incorporate strict controls into their design and location. However, should even a few of the numerous strict proposed new source requirements find their way into the existing source regulations, the electric power industry would face huge additional costs for little environmental benefit.

EPA Response

Today's final rule applies only to new facilities. EPA will consider all aspects of existing facilities in Phase II of this rulemaking. EPA recognizes that there are issues with existing facilities that are unique to those facilities.

Comment ID 316bNFR.039.003

Subject Matter Code 7.1

Definition: New Facility

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Facility Must Be A New Facility.

DOE wants to make sure that the boundary between new sources and existing sources is clearly and fairly set. Brand new facilities are obviously new sources, but there is some uncertainty over what sorts of modifications to plant facilities would trigger inclusion in the new source category. The preamble language on page 49066 gives some good examples, but the definition of "new facility "proposed on page 49116 is very general and could be interpreted in a variety of ways. We suggest that the definition on page 49116 be clarified and possibly incorporate some of the examples from page 49066.

EPA Response

EPA has clarified the applicability of the rule and provided examples as guidance with the rule language to further clarify the rule's scope.

Comment ID 316bNFR.039.004

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Robert S. Kripowicz

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At Least 25 Percent of the Total Flow Is Used for Cooling (page 49066).

DOE does not support this criterion. The rule provides no technical justification for the 25 percent value, which is more stringent than the values used in previous EPA proposals. Rather, DOE supports a criterion of at least 50 percent of the flow being used for cooling before the structure would be considered a cooling water intake.

EPA asks for comments on alternatives under which the threshold would be 5 percent, 10 percent, 15 percent, or 20 percent of the total flow being used for cooling (page 49067). DOE objects to any of these lower thresholds and supports the more reasonable threshold of 50 percent that EPA suggested in their 1970's guidance.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.039.005

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Robert S. Kripowicz

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Design Intake Flow is Greater Than 2 MGD (page 49067). DOE does not support this criterion. Many facilities that have already chosen closed-cycle cooling as their approach for Best Technology Available (BTA) will still need to withdraw quantities of make-up water to replace cooling water that has been evaporated or blown down. At large facilities, the volume of make-up water often exceeds 2 MGD. It seems highly unfair to require a facility that has already reduced its intake water flow by 90 percent or better to be subject to the other requirements proposed in the regulation.

EPA provides no justification for the 2 MGD criterion, although the Agency asks for comments on several higher volume thresholds. We continue to support a higher volume threshold. For example, the Maryland regulations, which have been touted as some of the more comprehensive State 316(b) regulations, allow a 10 MGD threshold for inclusion under those regulations. We further support a waiver from the new source regulations for facilities whose only cooling water usage is cooling tower makeup water. On page 49068, EPA cites the percentages of facilities that would be covered under a 2 MGD (99.97 percent), 10 MGD (99.67 percent), or 25 MGD (99.1 percent) threshold. It is highly unlikely that there is any statistically significant difference among those three percentages. If EPA's data or statistics are accurate, we feel there is little justification for requiring anything less than 25 MGD as a threshold.

We note an apparent discrepancy between pages 49067 (top of third column) and 49068 (top of first column) over the percentage of cooling water flows that would be encompassed by the 2 MGD threshold. One reference indicates that about 90 percent of flows would be covered while the other suggests that 99.97 percent would be covered.

EPA asks for other impingement and entrainment studies that look at facilities with relatively low flows. DOE has obtained a copy of impingement and entrainment studies for Westvaco Paper's Luke Mill on the Upper Potomac River in western Maryland. The intake flow rates during the study period were in the range of 44-48 MGD. Extremely low impingement and entrainment were observed. A copy of these studies is included with our comments.

EPA asks for comments on an alternative for small water bodies that would restrict the intake flow to 1 percent of the water body flow. DOE opposes this further restriction and suggests that decisions on this matter should be left to the discretion of permit writers. However, if EPA elects to include this restriction we support the low-volume waiver described on page 49068.

We further support a waiver from the new source regulations for facilities whose only cooling water usage is cooling tower makeup water.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and

entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA agrees that very large facilities that use closed cooling water systems may still require withdrawals of more than two (2) MGD. However, EPA does not agree that it is unfair to subject these facilities to further requirements necessary to reduce impingement and entrainment. Section 316(b) requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. While reductions in total intake flow may represent the single most significant improvement for new facilities with cooling water intake structures, large flows withdrawn for make-up (i.e., to replace evaporative loss and blow down) can still cause significant impingement and entrainment. Additional controls on intake velocity, flow relative to the source waterbody, and design and construction technologies proposed by the facility also represent important aspects of a cooling water intake structure that must, under section 316(b), be addressed. As discussed in the rule and in the Technical Development Document and Economic Analysis, these additional measures are both widely employed and affordable. EPA does not believe that a determination of “best technology available for minimizing adverse environmental impact” for new facilities can omit these low-cost, effective technologies. Also see Section VIII of the rule for a discussion that explains the percentage of new facilities already meeting the final rule requirements and the low cost of these requirements.

The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.039.006

Subject Matter Code MISC

Miscellaneous Comment

Author Name Robert S. Kripowicz

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Industry Segments Not Envisioned by EPA.

EPA anticipated that this rule would affect facilities in the electric power and some manufacturing industries. There are other industry segments for which EPA did not anticipate the rule would have any impacts. One of these segments, of particular interest to DOE, is the offshore oil and gas industry. There are hundreds of offshore oil and gas rigs in the Gulf of Mexico and dozens of others off the coasts of California and Alaska. These facilities produce a significant portion of the nation's oil and gas. Nearly all of these facilities withdraw sea water for a variety of uses on the rigs. Some of the rigs withdraw more than 2 MGD and use more than 25 percent of the water for cooling purposes, and therefore would be subject to these regulations.

Unlike fixed, onshore facilities that have the space to add extensive intake structure modifications, offshore oil and gas fixed platforms or mobile drilling vessels are extremely limited on space and, in most cases could not accommodate significant physical changes. We have learned from the International Association of Drilling Contractors that the 0.5 feet per second flow restriction is problematic because marine flow rates are generally designed to be high to discourage fouling by marine growth.

We are concerned that the rule has not considered the economic impacts to the offshore oil and gas industry, including the potential loss of production due to restrictions imposed by this rule. There is currently a worldwide shortage of drilling ship, barges, and other rigs. It is likely that numerous new drilling vessels will be built in the next 5-20 years. Some of these new vessels would be subject to the proposed rule and should be accounted for by EPA in its economic analysis. We would encourage EPA to exempt facilities whose main physical structure is located away from the shore from the proposed 316(b) requirements.

EPA Response

See response to comment 316bNFR.022.002 for the discussion on how EPA will examine various options for this industry sector in the Phase III 316(b) rule. EPA will work with industry and various Federal agencies to examine any potential impacts (including structural modifications) for each Phase III regulatory option. See response to comment 316bNFR.022.007 for the discussion on the relationship between cooling water intake velocity and marine growth.

Comment ID 316bNFR.039.007

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

What Constitutes AEI? (page 49074).

DOE strongly recommends that EPA revise its proposal to first define what constitutes AEI and then impose controls on those facilities that present an AEI.

On page 49074, EPA suggests a possible definition of AEI as impingement or entrainment of more than 1 percent of the organisms in a near-field area. We feel that there is little scientific basis for this proposed value. Aquatic ecosystems are subject to tremendous variability in abundance of various species. Particularly in the highly productive tidal and estuary water, natural annual and seasonal variability of organisms is typically at least an order of magnitude higher than 1 percent. One percent variability cannot even be measured accurately given the high level of natural variability. The impingement criterion should be expressed as percent impingement mortality rather than percent impingement because many impinged organisms are returned to the water body and survive.

We disagree with EPA's position that a threshold allowing millions of eggs, larvae, and adults to be impinged or entrained is always unacceptable (page 49074). There may be locations in which a million eggs and larvae represent a small fraction of a percent of the total number of eggs and larvae in those ecosystems. Most species that reproduce through broadcasting their eggs into the water column produce at least thousands of eggs per female. Predation and natural causes contribute to the death of all but a few of the eggs and larvae produced. Dead eggs and larvae that are not directly eaten decompose and contribute nutrients back to the ecosystem. Further, aquatic populations exhibit a phenomenon called compensation, through which populations produce more eggs if the standing stock of that species is low and less eggs if there are more members of the species present in the ecosystem. DOE believes that the potential for AEI should be judged for each intake in relationship to the body of water from which it withdraws cooling water.

DOE supports EPA's second alternative on page 49074 - determination of an acceptable magnitude of impingement and entrainment loss. We strongly oppose the third alternative presented on page 49704 - the concept that loss of a single fish constitutes AEI.

On page 49075, EPA seeks comments on a definition that would incorporate protection of species as well as community integrity. We conditionally support such a definition, depending on the specific requirements imposed. We also recommend that EPA consider nonaquatic AEI in addition to the more obvious aquatic AEI.

We do not agree with the rule's interpretation on page 49075 that AEI from cooling water intake structures must be minimized "to the fullest extent practicable" [emphasis added]. The Clean Water Act language does not include the italicized qualifying language. We would support a definition of AEI that incorporates the concept of "protection and propagation of a balanced indigenous populations of fish, shellfish, and wildlife" used in section 316(a).

EPA Response

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, today's rule does not interpret AEI in this fashion.

Please see responses to comments 316bNFR.029.013 (AEI interpretation), 316bNFR.068.015 (compensation), 316bNFR.014.013 (two-track framework), and 316bNFR.301.003 (nonaquatic impacts).

EPA does not agree that the CWA compels EPA to link 316(b) adverse environmental impact to the objectives of 316(a) of the Act (I.e., balanced indigenous population). EPA believes that the choice by Congress of different terms in section 316(b) versus 316(a) can be presumed to be intentional and purposeful. Bates v. U.S., 522 U.S. 23 (1997). Please see responses to comments 316bNFR.068.007, 316bNFR.068.008, and section VI.B.2.a. of the preamble for the final rule.

Comment ID 316bNFR.039.008

Subject Matter Code 10.01

Regulatory Framework Options

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Overview of Proposed Requirements for Minimizing AEI.

EPA summarizes its proposed requirements in Exhibit 1 on page 49077. Separate but similar standards are developed for different types of water bodies. DOE is quite concerned about the multiple requirements imposed on cooling water intakes. The rule does not present any information on how many facilities are likely to fall into each of the subcategories in its scheme, but we suspect that few facilities will fall into the subcategories that allow anything less than full flow reduction. This means that most facilities will have to install cooling towers. Traditionally, cooling towers were considered to be the last resort - the most expensive way of meeting BTA. Under this proposal, many facilities may start with cooling towers and then add several additional tiers of requirements on top of that. We believe that facilities should either follow a suite of operational and mitigative actions or install cooling towers depending on a site-specific evaluation, but not have to do both.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Under this approach new facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84. The record supports the determination that most facilities will install cooling towers independently of this rule.

Comment ID 316bNFR.039.009

Subject Matter Code 125.83.23

Definition: Tidal River

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The proposed definition for tidal river (page 49078) incorporates both a salinity component and a tidal-influence component. The key feature should be the tidal influence. There is no need to add a salinity component.

EPA Response

The commenter is correct, EPA has adopted its current definition of oceans based on the need to include nearshore coastal waters for purposes of Section 316(b).

Comment ID 316bNFR.039.010

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

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On page 49078, EPA states that estuaries and tidal rivers have a higher potential for AEI because they contain essential habitat and nursery areas. We agree that these water bodies are highly productive, but because of that productivity, they can compensate for various types of insults, either natural weather-related conditions, or human impacts like water intakes or commercial fishing operations. Further, not all parts of all estuaries and tidal rivers are sensitive habitats. Through careful siting of intakes, facilities withdrawing cooling water from estuaries and tidal rivers can minimize AEI.

EPA Response

EPA has adopted a technology-based approach to the rule whereby if a facility wishes a fast permit it may meet the track I requirements. EPA has taken an impingement and entrainment approach to Track I because there are many issue related to a population or community-based approach to AEI. For example, EPA considered the issue of compensation and its relevance to today's rulemaking effort (see Section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Further, although EPA agrees that tools such as estimating Maximum Sustainable Yield (MSY) can be useful for managing adult fish, EPA questions the relevance of such approaches when evaluating egg, larvae, and juvenile losses associated with cooling water intakes. EPA also notes that the models used to estimate MSY do not directly incorporate additional stressors other than fishing pressure, fisheries are often managed based on their optimum yield (a value less than the MSY), and fisheries experts acknowledge that there is a high degree of uncertainty associated with managing fish populations (see today's preamble Section VI.B.2.c). Finally, EPA considered the relative success of ongoing fishery management efforts implemented by NMFS and others. In particular, EPA considered that despite a long history of managing our national fisheries and the availability of state-of-the-art fish population models, NMFS recently classified 34% of their managed stocks as overutilized. Thus, given the high degree of uncertainty associated with managing fisheries, EPA supports the conclusions of a recent NMFS advisory panel that "The modus operandi for fisheries management should change from the traditional mode of restricting fishing activity only after it has demonstrated an unacceptable impact, to a future mode of only allowing fishing activity that can be reasonably expected to operate without unacceptable impacts."

With the two-track approach published today EPA allows facilities to locate CWISs anywhere within a waterbody as long as the requirements of Section 125.84 are met. EPA believes that the two-track technology approach, which does not distinguish between waterbody types or the location of the intake

structure within the waterbody type, serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.039.011

Subject Matter Code EXIST

Existing Facility Rule

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On page 49079, EPA refers to a "reluctance to fully reconsider permit conditions in light of new technologies." This seems to have little relevance in a new-source proposal. However, it suggests that EPA may follow the same approach outlined here in its existing-facility rulemaking. DOE believes that the approach proposed here should not be used as the basis for the existing source rule.

EPA Response

See response to comments 316bNFR.012.003 and 027.001.

Comment ID 316bNFR.039.012

Subject Matter Code 10.01

Regulatory Framework Options

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On page 49079, EPA notes, "Absent national requirements, State officials often lack authoritative guidance for their own regulatory efforts." This suggests that EPA feels that States lack the ability to evaluate 316(b) issues. We don't believe this to be true. At least some States have well-conceived and comprehensive 316(b) programs in place. DOE believes it would be a mistake to force those States to change from their functioning programs to fit into a rigid national framework.

EPA Response

EPA agrees that many States have well-conceived and comprehensive 316(b) programs in place. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility for the permittee and permit writer to work together to address site-specific concerns. Many of the States that have submitted comments have supported a technology-based approach and a quick, objective approach for new facilities.

Comment ID 316bNFR.039.013

Author Name Robert S. Kripowicz

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Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Other Regulatory Options.

EPA describes a site-specific option on page 49080 that is much more to DOE's liking than the favored option. If EPA does not include the site-specific option in the final rule, then DOE recommends that the rule include the rebuttable presumption language suggested on page 49080.

EPA Response

See response to comment 316bNFR.008.007 for information on why EPA is not adopting a case-by-case approach for today's rule. However, this rule was specifically written to allow site-specific determinations by the facility itself as to which technologies would be most appropriate based on their knowledge of conditions at the facility and in the waterbody.

See response to comment 316bNFR.009.004 for further information on why EPA is not adopting a rebuttable presumption approach for today's rule.

Comment ID 316bNFR.039.014

Author Name Robert S. Kripowicz

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA also describes a zero-water usage option that involves the use of dry cooling towers (page 49080). DOE suggests that the dry cooling tower option needs to be further evaluated as they are known to be much less efficient than wet cooling towers. To make up for their inefficiency, generating plants will need to produce more energy, using more fuel and creating more air emissions.

EPA Response

EPA agrees with the commenter that dry cooling installations at new generating plants will increase air emissions from new power plants (as compared to other wet cooling technologies) and that the technology will decrease generation efficiency at the installations. See Chapter 4 of the Technical Development Document and Section V.C of the preamble to the final rule.

Comment ID 316bNFR.039.015

Author Name Robert S. Kripowicz

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Subject Matter Code 10.12

Request for Comment: Best Technology Available Requirement "Trading"

On page 49082, EPA describes a framework under which operators could trade among the components of BTA. DOE supports that option and opposes another EPA option that would apply strict estuary and tidal rivers requirements to all water bodies (page 49082).

EPA Response

See response to 316bNFR.008.009 and the preamble to the final rule for an explanation of the basis of the determination that the track 1 requirements are technically available, economically achievable and have acceptable no water quality environmental impacts, including energy impacts.

Comment ID 316bNFR.039.016

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Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

On page 49083, EPA outlines yet another approach that would allow applicants to perform studies to make a site-specific BTA demonstration. DOE supports this option and encourages EPA to incorporate as much flexibility into the final rule as possible.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

Comment ID 316bNFR.039.017

Author Name Robert S. Kripowicz

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Subject Matter Code 10.03

Additional Littoral Zone Requirements

Littoral Zone (page 76). EPA describes its definition for "littoral zone" on page 49083. The definition includes elements related to:

- the distance from shore at which the photic zone ends,

- the location at which there is a significant change in slope that results in changes in habitat and/or community structure, and [emphasis added]

- the location at which there is a significant change in the composition of the substrate

We believe that the use of "and" will lead to great confusion. It is unlikely that any specific location will meet all three of these criteria. For example, the photic zone may extend out 20 meters from shore, but there may be no change in slope or substrate composition for 3 miles. How would EPA select the edge of the littoral zone under these circumstances? We believe that the definition of the littoral zone will present great difficulty for regulatory agencies and permittees to interpret.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.039.018

Subject Matter Code	11.0
Best Technology Available-Location	

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Actual Examples of Impingement and Entrainment in Sensitive Areas.

EPA assumes that certain types of water bodies or portions of a water body will be more sensitive than others and has imposed a more onerous suite of requirements on those areas. In particular, EPA requires extra conditions for all portions of estuaries and tidal rivers and areas within the littoral zone in rivers, streams, and lakes. In the most general sense, EPA is correct - these area often have great biological productivity and therefore, more organisms are potentially at risk.
However, not all portions of estuaries, tidal rivers, or littoral zones are areas of concern. We have obtained copies of two sets of entrainment and impingement studies required by the Maryland Department of the Environment, which administers one of the most comprehensive State 316(b) regulations in the country. The studies are significant for two reasons: (a) they are both for manufacturing industries (and EPA has few or no studies in this category); and (b) they are both done in sensitive areas and show no unacceptable environmental impacts. The studies, copies of which are included, are summarized below.

Example 1 -Bethlehem Steel- Sparrows Point Mill: Bethlehem Steel operates a large integrated steel mill on the northern shore of Baltimore Harbor. Over 500 MGD of cooling water is withdrawn from two intakes, both of which are located in small tidal embayments off of the main harbor. The final entrainment report concluded that the tidal embayments around the mill did not appear to be spawning or nursery areas of consequence (the criterion specified in the Maryland regulations) and the two intakes had a de minimis environmental impact.

Under the Maryland regulations, impingement liability is determined by estimating the number of different types of fish impinged during a year, assigning an economic value to them, and totaling the value of the impinged fish for a five-year period. Bethlehem's liability under this procedure was $372,000. The NPDES permit subsequently issued to Bethlehem concluded that no significant improvements could be made to the intake structure for that dollar value, and the intakes were determined to represent BTA.

Example 2- Westvaco Paper -Luke Mill: Westvaco manufactures fine paper at a large mill adjacent to the North Branch of the Potomac River near Luke, Maryland. The river appears to be from 100 meters to 150 meters wide at the intake location. Under EPA 's categorization scheme, the intake would be either in the littoral zone or within 50 m of the littoral zone of one river bank or the other. From 44 MGD to 48 MGD of cooling and process water are withdrawn from a pool created by a low-head dam just downstream of the intake. The Savage River enters the North Branch of the Potomac about 0.7 miles upstream from the mill. The original 316(b) studies were done by Westvaco in 1987. At that time, water quality in the Savage River was diminished due to acid mine drainage from numerous coal mines in the area. During the next NPDES permit renewal, the Maryland Department of the Environment required Westvaco to repeat the 316(b) studies in 1991 because water quality in the Savage River had improved noticeably, and there was concern that the improved water quality would create a situation under which more organisms were available to be impinged and entrained.

Both studies reached similar conclusions, however.

The 1987 study found that the intake is located in an area that is not a spawning or nursery area of consequence. In fact, during three entrainment sampling runs, not a single fish larva or egg was found. Only 25 fish of 9 species were identified during two electroshocking surveys in the area. Various macroinvertebrates were entrained, but none were considered by the Maryland Department of the Environment to be important species. Impingement sampling turned up only 2 fish.

The 1991 study found more entrainment than the earlier study but the levels were still very low. Impingement was virtually nonexistent. The only fish that was impinged had been previously caught by an angler (a hook was still in its mouth), had died or become weakened from that experience, and was later washed onto the intake screens. The Maryland Department of the Environment subsequently reissued the NPDES for the Luke mill, including the 316(b) approval

The purpose of discussing these two sets of studies is to show that cooling water intakes can be located in areas that are classified as sensitive areas by EPA's proposed rule. Not all portions of all estuaries, tidal river, and littoral zones are spawning or nursery areas of consequence or are laden with fish that could be impinged. This further supports DOE's premise that the most reasonable way to evaluate AEI is by conducting site-by-site studies.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.039.019

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Flow and Volume Requirements.

DOE does not support mandatory flow and volume restrictions. If EPA elects to keep flow restrictions, there should be an opportunity to provide a site-by-site waiver upon a demonstration by the applicant. On page 49085, EPA seeks comments on alternate percentage of source water annual flows. If a flow limit is selected, it should be as high as possible. For example, the Maryland 3l6(b) regulations allow for exclusion from those regulations for facilities withdrawing up to 20 percent of average flow.

EPA Response

EPA believes the intake capacity limitations in today's final rule are reasonably achievable and economically practical for industry as a whole. EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See ,# 2-029, 2-013L-R15 and 2-013J).

EPA disagrees with the commenter's call to allow a site-by-site determination of an appropriate flow restriction by the either the applicant or the permitting authority. A case-by-case approach would run counter to EPA's mandate to fashion a nationally-applicable standard, the absence of which would create an undue burden on state agencies and the potential for widely-varying levels of protection in different areas of the country. EPA does not believe the level of protection achieved by the Maryland regulation is appropriate for a national standard.

EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

EPA has provided a limited provision for alternative requirements where the applicant has serious local concerns that were not considered by EPA in issuing today's final rule.

Comment ID 316bNFR.039.020

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 12.12

25% 7Q10

On page 49085, EPA estimates the level of protection resulting from using 25 percent of the 7Q 10 to be more than 99 percent. No justification is provided for this claim.

EPA Response

EPA has opted not to include the 25% 7Q10 standard in today's final rule.

Comment ID 316bNFR.039.021

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

On page 49086, EPA postulates that 89 percent of existing non-nuclear facilities would not be affected by the proposal, assuming they operated in compliance with the flow recirculation requirements [emphasis added]. This is an unreasonable assumption because many of these facilities do not comply with a 100 percent flow recirculation requirement. We believe that this entire paragraph is irrelevant.

EPA Response

EPA disagrees that the paragraph cited by the commenter "is irrelevant." On the contrary, as stated in the proposal (in full context), the Agency provided the information "as another gauge of the siting impacts of the proposed flow requirement for new facilities." The paragraph in discussion referred specifically to the proportional flow requirement of the proposal, as defined on page 49085 of the proposal. Contrary to the commenter's paraphrasing of the paragraph, EPA did not state that 89 percent of the existing non-nuclear utility facilities "would not be affected by the proposal," but rather, the Agency stated the facilities "would be able to be sited at their current location under today's proposed requirements if they also operated in compliance with the flow reduction requirements proposed today." See the preamble to the final rule.

EPA did not propose, and has not adopted 100 percent flow recirculation requirements. The paragraph quoted by the commenter did not relate to the flow reduction requirement of the proposal (that requiring a reduction in flow commensurate with the level achieved using closed-cycle recirculating cooling systems). Therefore, due to basic issues of clarity, EPA questions and rejects the assertion that an analysis of existing plants for siting implications of a proportional flow requirement is irrelevant. As EPA stated, the paragraph was provided as "another gauge" of the siting implications of the proportional flow requirements of the proposal, and as such the commenter's assertion does not address the topic.

Comment ID 316bNFR.039.022

Subject Matter Code	12.3
	Estuaries/Tidal Rivers

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

EPA suggests that limiting withdrawal from estuaries and tidal rivers to 1 percent of the one tidal excursion volume will protect 99 percent of all organisms in the area influenced by the cooling water intake. This assumes that organisms are evenly distributed and ignores the principle of compensation. DOE suggests that this restriction be deleted or relaxed to a higher percentage.

EPA Response

EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. EPA disagrees with commenters that other factors influential to impingement and entrainment have been ignored. Both Track I and Track II of the final rule allow for site-specific evaluations in determining the appropriate technologies to be implemented. For example, the Design and Construction Technology Proposal Plan required in Track I and the Evaluation of Potential Cooling Water Intake Structure Effects in Track II allow for site specific consideration of factors other than flow to minimize impacts from impingement and entrainment. Cumulative impacts are addressed on a case-by-case basis by each permitting authority.

EPA expects that this final regulation will reduce impingement and entrainment at new facilities. The final rule establishes requirements that will help preserve aquatic organisms and the ecosystems they inhabit in waters used by cooling water intake structures at new facilities. EPA has considered the

potential benefits of the rule; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures. The preamble discusses these benefits to the extent possible in qualitative terms.

EPA is no larger basing the proportional flow requirement on a 99% protection basis, but rather a technology basis. See the preamble to the final rule and response to comment 068.075.

Comment ID 316bNFR.039.023

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 13.3

Request for Comment: Consideration of Site-specific Determinations

Velocity Requirements.

On page 49088, EPA seeks comments on case-by-case velocity limits. DOE supports the concept of case-by-case velocity limits. Each facility should be given the opportunity to demonstrate an acceptable velocity. Restriction to a low national velocity limit may limit the options available to intake operators and preclude the use of technologies that have an overall lower environmental impact.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Additional Technologies (page 49089).

As noted above, DOE does not support the idea of heaping layers of requirements on top of cooling towers. We believe that many of the additional technologies described in this section are valid in the proper circumstances, but should not automatically be applied in addition to cooling towers.

EPA solicits comments on the idea of making certain additional technologies part of the national minimum mandatory standards. DOE does not support this idea.

EPA Response

The final rule adopts a two-track approach. Track I specifies intake flow, velocity and source water-based flow requirements, as well as, where specified conditions exist, selection and implementation of design and construction technologies that are most effective in minimizing impingement mortality and entrainment of all life stages of fish and shellfish. New steam electric facilities that withdraw greater than 2 MGD and less than 10 MGD are not subject to the intake flow requirements but must select and implement design and construction technologies that minimizing impingement mortality and entrainment of all life stages of fish and shellfish. EPA's record supports a determination that all of the requirements of the rule are technically available and economically practicable for new facilities and do further reduce impingement and entrainment. New facilities have the greatest opportunity to plan to install technologies. EPA also notes that there is support for the velocity, proportional flow requirements, and design and construction Under Track II, a new facility can demonstrate a level of performance comparable to Track I through the use of any technologies, including design and construction technologies. Thus, the final rule provides greater focus in the use of design and construction technologies and provides a high degree of flexibility to permittees to optimize and apply design and construction technologies in a manner in which such technologies are most effective.

Comment ID 316bNFR.039.025

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Restoration.

DOE supports EPA's decision to not include mandatory restoration in the proposed role. We believe the concept of restoration measures is viable only as a voluntary option when other technology options are either less effective or are not cost-effective (page 49090).

EPA Response

See response to comment 316b NFR.024.004 and preamble sections V.B.2.f and VI.L.

Comment ID 316bNFR.039.026

Subject Matter Code 15.13

Discretionary/Voluntary Approaches

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We support the idea of a banking mechanism (page 49091) as a means for achieving restoration DOE has supported the concept of wetlands mitigation banking and views this as a similar opportunity.

EPA Response

Although EPA is not including in today's final rule a structure for a banking system, see 316bNFR.008.012, EPA believes that states may use state authorities to implement such a system. See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.039.027

Subject Matter Code	16.4
Request for Comment: Provision for Variance for Any National Best	

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Alternative BTA Requirements.

DOE supports the concept of a variance from the standard BTA requirements on the basis of wholly disproportionate costs (page 49091). We encourage EPA to craft the variance in such a way that legitimate applicants will have a reasonable chance of success. We believe that leaving the final decision-making authority in the hands of the State permit Directors or Regional Directors for non-delegated States will eliminate some of the red-tape and delays that have impeded approval of other Clean Water Act variances in the past (see Veil, J., 1993, Using Clean Water Act Variances as Economic Incentives, Journal of Environmental Regulation 3(3): 281-291.)

On page 49092, EPA invites comments on other factors that should be allowed for consideration for a variance. DOE believes that variances should be allowed for a variety of site-specific factors and for consideration of energy and non-water-quality environmental impacts. EPA discusses alternative, less stringent requirements in cases when the cost of compliance would be wholly disproportionate to the projected environmental benefits (page 49092). DOE supports this model and cites the effective Maryland 3l6(b) program as an example of such an approach.

EPA Response

While EPA has adopted a variance in this new facility rule, for an explanation of the reasons that EPA did not adopt the approach suggested by the comment, see response to comment 316bNFR.027.020. EPA intends the alternative requirements of today's rule (40 CFR Part 125.85) to allow for less stringent requirements when the applicant shows that compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs EPA considered in establishing that particular requirement. EPA has been careful to make sure its cost analysis is complete and has included this alternative requirements provision as a process in case a particular facility's costs have not been considered. For more information on EPA cost analysis see section VIII of the preamble. However, the alternative requirements provision of 125.85, like a variance provision, is designed to be narrow and the cases where it would apply are to be exceptions and not the norm, a consideration that also helps explain the low numbers of other CWA variance approvals in the past. Finally, EPA disagrees with the commenter that state permit directors or regional directors should bear the burden of reviewing the cost analysis record in order to make decisions regarding a facility's request under 125.85. EPA has developed an extensive record and a body of knowledge on the cost analysis of today's rule and given the narrow application of this provision and the need for consistency as a matter of fairness, it believes the decision should remain with the Administrator.

Comment ID 316bNFR.039.028

Subject Matter Code	16.1
Discretionary Options Available to the Director	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

On page 49092, EPA discusses another alternative approach that would give permit Directors broad discretionary authority to impose additional requirements where they are needed. In line with DOE's stated preference for a site-by-site determination of the appropriate suite of requirements, we do not object to that approach, although we believe that Directors already have broad authority under the NPDES regulations, and in some cases, State statutory authority.

EPA Response

See response to comment 316bNFR.026.012

Comment ID 316bNFR.039.029

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 16.5

Request for Comment: Use of Innovative Technologies

Also on page 49092, EPA describes an additional variance alternative dealing with innovative technologies. DOE supports this alternative, but recommends that no consultation with or approval by the Administrator be required.

EPA Response

See response to comment 316bNFR.071.019 and 316bNFR.039.027

Comment ID 316bNFR.039.030

Subject Matter Code 24.1

EEA - Baseline and Projected Costs

Author Name Robert S. Kripowicz

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Costs.

DOE believes that the rule still underestimates the cost of these proposed requirements. On page 49094, EPA notes that new facilities would incur only the cost of any incremental difference between their planned cooling water intakes structure technology and that required by the proposed rule. We agree, but believe that the baseline set of technologies and controls that utilities would voluntarily choose in the absence of national 316(b) regulations needs to be better defined. We suggest that the proposed regulation will force some utilities to employ technologies that are considerably more rigorous and expensive than they would otherwise need to use.

EPA Response

The commenter believes that the baseline set of technologies and controls that utilities would voluntarily choose in the absence of national 316(b) regulations needs to be better defined. EPA disagrees with this comment. EPA's cost analysis is based on the best information that was available at the time. Baseline technologies for coal facilities and manufacturing facilities are based on the section 316(b) Industry Survey of existing facilities. This information was provided by the regulated industry. For combined-cycle facilities, the baseline technologies are based on combined-cycle facilities proposed for construction over the next several years. The baseline technology information was provided by state permitting authorities and is largely based on permit application. EPA believes that these data sources provide the best information on baseline technologies employed in the recent past and proposed for the near future.

Comment ID 316bNFR.039.031

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Robert S. Kripowicz

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Source Water Monitoring Study (pages 49096-49097).

EPA proposes requiring applicants to prepare and submit detailed baseline ambient biological studies. In most circumstances, facilities would prepare these studies anyway. We recommend that EPA give only very general guidelines for this type of background monitoring and allow the permitting authorities and the applicants to mutually develop site-specific plan criteria.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.039.032

Subject Matter Code 20.5

Weekly Visual Inspections

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Monitoring.

EPA requires weekly visual inspections of control technologies and restoration efforts (page 49100). It is unlikely that these features would change dramatically in a week's time. We suggest that the frequency be reduced to monthly or quarterly.

EPA Response

EPA disagrees with the commenter that visual inspections would be just as effective on a monthly or quarterly basis and has maintained a weekly requirement. In particular, in fish handling systems it is important to monitor components such as troughs and sluices that may carry both fish and debris to determine if the passage is maintained so that organism may be returned to the source waterbody as soon as possible. Otherwise, the survival of the organisms are at risk. For other technologies that use fish behavioral mechanisms it is important to determine whether the technology is operating efficiently and to make sure that debris is not effecting its performance.

Comment ID 316bNFR.039.033

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Subject Matter Code 24.0

Economic and Engineering Analysis (EEA)

Comments on EPA's Economic and Engineering Analyses of the Proposed§316(b) New Facility Rule (EPA 2000)

In summary, based on the following comments, DOE believes that EPA's Economic Analysis is inaccurate and underestimates the actual cost of this proposed rule. We recommend that the Economic Analysis be redone with more realistic information.

EPA Response

EPA has considered each of the issues raised by the commenter (presented in comments 316bNFR.039.034 through 316bNFR.039.044, in comment categories 21.1 and 24.2). A discussion on each of the 11 topics raised by the commenter can be found in the responses to these comments.

Comment ID 316bNFR.039.034

Subject Matter Code	24.2
	EEA - Estimation of Unit Costs

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Extending Intake Pipes

On page 6-2, EPA states its assumption that the littoral zone ends approximately 25 meters from the shoreline. Although footnote 2 on that page acknowledges that littoral zones may be larger or smaller than 25 meters, we are concerned that a 25 meter-littoral zone assumption will greatly underestimate the distance from shore that would be shallow enough to accommodate littoral zone activity. In many areas of the mid-Atlantic and Gulf of Mexico coasts, water depths drop off at a very gradual rate, and the boundary of the areas with littoral zone activity could be many hundreds of meters from the shoreline. The cost of extending intake pipes will be seriously underestimated if EPA assumes that plant operators would need to extend pipes only 75 meters.

On the same page, EPA notes another assumption that the source water body is wide enough so that a pipe extending 75 meters from one shore will be at least 75 meters from the opposite shore. In other words, the body of water would need to be at least 150 meters wide at the point of the intake. This may be a valid assumption for major power plants, but is not reasonable for manufacturing facilities, many of which are located on portions of rivers or streams that are narrower than 150 meters.

EPA Response

EPA is no longer varying requirements based on the concept of a littoral zone in the new facility final rule. See response to comment 316bNFR.047.001.

Comment ID 316bNFR.039.035

Subject Matter Code 24.2

EEA - Estimation of Unit Costs

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Costs for Characterization Studies

Table 6- 7 shows a source water baseline characterization cost of $12,405 and Table 6-8 shows a source water baseline characterization cost of $11,319. We believe that these seriously underestimate the actual costs. Some of the utilities in Maryland have spent hundreds of thousands to millions of dollars in performing baseline characterization studies.

EPA Response

EPA has revised the cost estimate of baseline and monitoring studies to meet concerns expressed in this comment and others. See response to comment 316bNFR.027.048, 028.027, 041.011, 056.059 and the preamble of the final rule.

Comment ID 316bNFR.039.036

Author Name Robert S. Kripowicz
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Subject Matter Code 21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule

Worst Case Analysis Costs

On page 6-22, EPA states that "the flow used for costing the recirculating cooling tower is 10 percent of the original flow since the flow will be reduced in the new recirculating system." We agree that the total volume of water that would be withdrawn from the surface water source would decline greatly under a recirculating system (and may be somewhere close to 10 percent), but we believe that EPA has overlooked the more important flow parameter - recirculating flow rate. The cooling tower and its associated pumps would be sized on the heat rejection requirements of the generating unit. We believe that the daily volume of recirculating water moved by the pumps in a cooling tower system would be similar in size to the daily volume of surface water withdrawn by a once-through system, assuming they are applied to the same generating unit. By taking only 10 percent of the actual flow rate, the rule underestimates the capital cost and O&M costs of the cooling tower.

This is illustrated by EPA's calculations in Table 6 of Appendix B. EPA looks at hypothetical examples for two coal-fired plants and two nuclear plants. One coal plant and one nuclear plant will already have cooling towers as part of their system designs, but the other plant of each type will need to modify their designs to include cooling towers. The flow rates of these plants are indicated on page AppB-6-1, but are reduced by a factor of ten on page AppB-6-2 in the column titled "Flow needed for Recirculating Cooling Tower". It is not clear what flow rate was used to generate the capital cost estimates shown on page AppB-6-3. Further, the rule does not indicate what type of tower would be employed and what <delta>T value was used. In any case, the recirculating flow rates of 750,000 gallons per minute (gpm) for the coal plant and 2,035,420 gpm for the nuclear plant far exceed the range of cooling tower flows considered by EPA in its cost equations. As discussed in greater detail below, at least some of the cooling tower capital cost equations become inaccurate at high flow rates.

DOE notes that if EPA did indeed use the 10 percent flow rate rather than the full flow rate, the overall capital costs will be much higher and could push this rule beyond the $100 million threshold.

EPA Response

As stated in the NODA, EPA agrees that the proposal methodology of using 15 percent of the original cooling flow as the recirculating flow for costing was incorrect. EPA also agrees that the correct daily volume of recirculating water moved by the pumps in a cooling tower system would be similar in size to the daily volume of surface water withdrawn by a once-through system for the same generating unit. Hence, EPA estimates cooling flow in this manner for the final rule.

The costs of today's final reflect this design change and do not exceed $100 million.

Comment ID 316bNFR.039.037

Subject Matter Code	24.2
	EEA - Estimation of Unit Costs

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Cost Equations

DOE is concerned about the use of cost equations with up to fourth-order exponential terms. This seems to be more complicated than necessary. It appears that the authors intended to correlate the available costs using whichever representation led to the highest correlation coefficient. This can result in behavior typical of equidistant interpolation with polynomials of high degree (Runge's phenomenon) and can lead to anomalous results within and outside of the range of the independent variable. We have noted several rather important errors in those equations. Representative examples of those errors are described below, but we encourage EPA to go back and check all the equations.

Example A

The intercept of the equations is generally non-zero, which would result in non-zero costs for a zero value of the independent variable (e.g., flow rate).

Example B

Table 1<listed below> shows a comparison of two methods for calculating the capital cost of traveling screens with fish handling equipment. First, EPA's tabulated capital costs for traveling screens with fish handling equipment, a velocity of 0.5 fps, and a 10-foot panel width (EPA 2000, Table A-24b) and second capital costs with the costs calculated through use of the cost equation from EPA (2000), Table A-25a. This equation is:

y = 2E-13x<exp>4 -3E-08x<exp>3 + 0.0017x<exp>2 -22.793x + 293,474 (1)

where x is the capital cost and y is flow in gpm. It is apparent that the tabulated and calculated capital costs differ significantly for higher water flows and it is not clear which method EPA actually used.

An approach historically taken for correlating capital cost is through use of the power-law representation (Capital Cost = A * X<exp>b), as described in the book, Basic Cost Engineering, Third Edition (1996). It may be advisable for the authors of this report to consider the application of lower-order correlations, albeit with lower correlation coefficients.

Example C

EPA estimates the capital costs of cooling towers without special environmental impact mitigation features in Table A-5 of EPA (2000). The equations used to generate these costs are shown in Table A-6 of EPA (2000). For the sake of illustration, let's look at the equation for redwood towers:

y = -1E-10x<exp>3 - 9E-06x<exp>2 + 56.453x + 49,125 (2)

where x is the capital cost and y is the flow in gpm. This equation is doomed to inaccuracy for higher flow rates because both the x<exp>3 and the x<exp>2 terms are negative. As flows increase, those terms will grow much faster than the x and the x<exp>0 terms. Table 2<listed below> shows the calculated capital costs at different flow rates. As flow increases up to 400,000 gpm, the cost increases, although the rate of increase slows down noticeably from the 204,000 gpm value to the 400,000 gpm value. Moving from the 400,000 gpm value to the 600,000 gpm value, the cost decreases, which would never occur in real life. Finally, when the flow is set at 800,000 gpm, the calculated cost is negative.

EPA estimated costs up to only 204,000 gpm; therefore, the Agency's equations are based solely on flows up to that value. The Edison Electric Institute's Power Statistics Database, prepared by Utility Data Institute, Washington, D.C., (April 1996) contains flow rates for most utility plants using cooling towers. Many units have flow rates higher than 204,000 gpm and one unit has a flow rate of over 800,000 gpm. The proposed equations are clearly inadequate for flows of those magnitudes.

The typical approach for estimating capital costs of cooling towers is to assume a linear dependence between cost and water flow rate. For example, Process Plant Construction Estimating Standards (1994) by Richardson Engineering Services indicates that the capital cost of a cooling tower is dependent on the product of cooling tower cost factor "C" and an unit cost of $324,000, where C depends on the water flow and the temperature delta. We recommend that EPA consider correlating the cooling tower capital costs using a linear representation.

Table 1 -Comparison of Cost Estimates for Traveling Screens with Fish Handling Equipment, a Velocity of 0.5 fps, and a 10-foot Panel Width

Flow (gpm)<sup>a	EPA Tabulated Costs from Table A-24b, EPA (2000)	Calculated Costs Using Equation 1
9,000	$202,000	$205,965
22,000	$307,000	$343,427
34,000	$458,000	$573,695
56,000	$589,000	$1,049,709
73,000	$720,000	$1,701,965

a Flow values taken from Table A -19b, EPA (2000)

Table 2 -Cost Estimates for Redwood Cooling Tower without Special Environmental Impact Mitigation Features Using Equations from Table A-6, EPA (2000)

Flow (gpm)	Calculated Costs Using Equation 1
2,000<sup>a	$161,994
31,000<sup>a	$1,787,540
204,000<sup>a	$10,342,027

400,000<sup>b	$14,790,325
600,000<sup>b	$9,080,925
800,000<sup>b	-$12,000,000<sup>c

a Lower, intermediate, and upper flow values taken from Table A -5, EPA (2000).
b Flow values higher than considered by Table A-5, EPA (2000), but within the range of flow values found at existing utility cooling towers.
c Note that this cost becomes negative.

EPA Response

EPA agrees that the use of 4th order cost equations imparts an unnecessary degree of complexity to the cost equations. In the final cost estimate analysis, EPA has limited the polynomial cost equations to 3rd order or less.

EPA also agrees with the commenter that beyond the recommended range of the polynomial equation, the independent variable could give unreasonable estimates for the dependent variable. EPA took care not to use the cost equations to predict costs beyond the recommended range of the equations. To determine what the recommended range should be, EPA evaluated the equation curve projections for independent variable values above the maximum used to develop the cost equations and concluded that for independent variable values within a range of up to 10 percent above the maximum development value, the dependent variable values continued to follow the curve trend. For many curves the trend continued beyond the 10 percent value, but EPA chose to use 10 percent as the limit throughout the analysis.

The method used by EPA for the final rule was that if the independent variable was greater than 10 percent above the maximum development value used to generate the equation, the independent variable value was divided into equal parts such that the individual parts were each as large as possible but less than 10 percent above maximum value. The cost of each part was then estimated using the cost equation and the cost of the parts were then added together. This was done separately for both capital and O&M costs. Essentially, costs were developed for multiple parallel units of equal size that together would have the total capacity of a larger undivided unit. In the case of cooling towers, this approach fits quite well with the fact that cooling towers tend to consist of multiple modular cells in parallel. Thus, in most cases, basing the costs on multiple parallel smaller units will result in a and accurate estimate of the total cost as compared to what would be expected had the cost equations had a greater independent variable range.

EPA notes that it fitted equations to data, then used equations to develop facility cost estimates. EPA recognizes problems associated with use of fourth order equations (hence, we have limited them to third order equations in the final rule) and that fourth order equations developed for traveling screen cost estimates at proposal gives errors at high flows. Therefore, for the final rule, EPA adjusted the equations so that no equations higher than third order were used.

EPA recognizes that high order polynomial equations can result in the dependent variable decreasing with high independent variable values (which corresponds, in the case for EPA's equations of greater

than 400,000 gpm flow values). Cost equations are not intended to be used above the range of flows for which they were developed (for example, above 204,000 gpm). For flows above the upper end of cost curves, EPA costed multiple towers of equivalent size (for example, for flow of approximately 400,000 gpm, EPA would estimate two towers of 200,000 gpm each).

Regarding linear dependence between cost and water flow rate, EPA notes that this form of scaling-up is common engineering practice for developing cost estimates. However, linear equations cannot account for economies of scale and will overestimate costs at high flows when economies of scale are appropriate.

Comment ID 316bNFR.039.038

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Subject Matter Code 21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule

Cost Estimate for Cooling Towers

EPA cites estimates for the capital cost of a new basic Douglas fir cooling towers at between $45 and $54 per gpm (Table A- 7, EPA 2000). If other types of tower materials are used, the cost can increase to as high as $63 to $75 per gpm (concrete tower). We believe that these costs are in 1999 dollars.

Two separate studies in the early 1990s attempted to estimate the cost of retrofitting cooling towers at plants with once-through cooling systems. Argonne National Laboratory obtained capital cost estimates for retrofitting cooling towers at 38 plants representing 14 utility companies through direct communication with those companies (J.A. Veil, 1993, Impact on the Steam Electric Power Industry of Deleting Section 316(a) of the Clean Water Act: Capital Costs, ANL/EAIS-4, Argonne National Laboratory, Argonne, IL, January 1993). The data are shown in Tables 3 and 4 <listed below> and are plotted in Figures 1 and 2<see attachment>. The average cost rate for fossil-fueled plants was $1 08/kW and for nuclear plants was $171/kW, expressed in 1992 dollars. The fossil-fueled data show a very strong correlation; the nuclear data did not. The Construction Cost Index (http:/ /www.ern.com/costlcostcci.asn) allows conversion of costs from different year dollars. To convert 1992 dollars to 1999 dollars, the 1992 costs must be multiplied by a factor of 1.21. This yields cost estimates of$131/kW for fossil-fueled plants and $207 for nuclear plants.

The second study, conducted by Stone and Webster Engineering, developed independent cost estimates for a hypothetical retrofitted natural draft tower at a nuclear plant ($230/kW) and a retrofitted mechanical draft tower at a fossil- fueled plant ($130/kW), both in 1992 dollars (Stone and Webster, 1992, Evaluation of the Potential Costs and Environmental Impacts of Retrofitting Cooling Towers on Existing Steam Electric Power Plants That Have Obtained Variances under §316(a) of the Clean Water Act, April). These can be converted to 1999 dollars as follows: $157/kW for fossil fueled plants and $278/kW).

As a conservative estimate, we will use the Argonne cost estimates, which are lower. To correspond to EPA's costs, expressed as $/gpm, the Argonne cost rates must be multiplied by the ratio of gpm to MW. To get an estimate of that ratio, we used the Edison Electric Institute's Power Statistics database to compile information on recirculating flow rate and nameplate capacity for all generating units that use cooling towers. The data are plotted in Figure 3 {see attachment 316bNFR039_Figures}. Most of the 510 data points tend to cluster along a tight line (correlation of 0.936), although some of the higher values tend to be outliers. The slope of the regression line of the entire set of data is 0.00229, or expressed another way, 1 MW equals 437 gpm. We did not distinguish between fossil-fueled and nuclear plants so the same ratio is applied to the cost rates for both types of plants. The resulting cost estimates are now $300/gpm for fossil-fueled plants and $474/gpm.

These costs are for retrofitting cooling towers. Science Applications International Corporation prepared the background report that was used to write Appendix A (SAIC, 2000, Cost Research and

Analysis of Cooling Water Technologies for 316(b) Regulatory Options, April). EPA assumes that the cost of constructing new towers at a greenfields site is about 20 percent less than retrofitting a tower at a site which is already using once-through cooling (SAIC 2000, page 15). In order to compare to EPA's estimates, the cost estimates from the previous paragraph must be reduced by 20 percent to approximate the costs of new construction. The resulting DOE estimates are $250/gpm for fossil-fueled plants and $395/gpm for nuclear plants. These are substantially higher than EPA's estimates of$45 to $75/gpm as noted above. EPA's contractor made a reasonable attempt to collect cost information from cooling tower vendors, but apparently was unable to capture overall costs in a realistic manner. The Argonne data were based on actual estimated costs developed independently by many utilities and should serve as a good starting point for costs. Had the DOE recalculation used the Stone and Webster cost data, the revised cost estimates would have been even higher.

We also offer a draft cost estimate that was generated for a proposed 2,400 gpm cooling tower with a DT of 10° F at a DOE facility designed to manage depleted uranium hexafluoride (Elayat, H., et al., 1997, Draft Cost Analysis Report for the Long-Term Management of Depleted Uranium Hexafluoride, Lawrence Livermore National Laboratory, UCRL-AR-127650, May). Bechtel Engineering, a national engineering firm, developed the cost estimate of $900,000, which corresponds to $375/gpm. This cost rate is comparable to the ones calculated by DOE in the previous paragraph.

Table 3 -Summary of Retrofitting Costs for Fossil-Fuel Units

				Cost to Retrofit	
Company	Plant	Fuel	Power (MW)	In Millions of 1992 Dollars	$/kW
New England Power	Manchester St.	Gas/oil	455	39	86
Baltimore G&E	Crane	Coal/oil	376	30	80
Baltimore G&E	Wagner	Coal/oil	989	70	71
PEPCO <sup>a	Chalk Point	Coal/oil	710	246	346
Florida P&L	Cape Canaveral	Gas/oil	864	28	32
Florida P&L	Fort Myers	Oil	597	25	42
Florida P&L	Cutler	Gas	235	26	111
Florida Power Co. <sup>b	Crystal River	Coal/nuc.	964	256	266
Pacific G&E	Moss Landing	Gas/oil	558	53	95
Pacific G&E	Pittsburgh	Gas/oil	1,302	143	110
Pacific G&E	Contra Costa	Gas/oil	1,206	110	87
San Diego G&E <sup>c	Encina	Gas/oil	315	38	121
TVA	Bull Run	Coal	950	114	120
TVA	Colbert	Coal	1,350	148	110
TVA	Cumberland	Coal	2,600	271	104
TVA	Gallatin	Coal	1,255	133	106
TVA	Johnsonville	Coal	1,485	162	109
TVA	Kingston	Coal	1,700	168	99
TVA	Widows Creek	Coal	1,969	204	104
TVA	John Sevier	Coal	800	99	124
Amer. Electric Power	Cardinal	Coal	600	48	80

Amer. Electric Power	Conseville	Coal	415	22	53
Amer. Electric Power	Picway	Coal	100	6	60
Amer. Electric Power	Kammer	Coal	630	65	103
Amer. Electric Power	Kanawha	Coal	400	30	75
Amer. Electric Power	Muskingum Riv.	Coal	840	69	82
Amer. Electric Power	Philip Sporn	Coal	1,050	87	83
Amer. Electric Power	Tanners Creek	Coal	995	72	72
Amer. Electric Power	Kyger Creek	Coal	1,095	123	112
Amer. Electric Power	Clifty Creek	Coal	1,290	148	115
Comm. Edison <sup>d	Kincaid	Coal	1,141	124	109
Total			29,290	3,157	
Overall Average					
108					

Table 3 -Summary of Retrofitting Costs for Fossil-Fuel Units

a PEPCO estimates that it would cost $346/kW for a mechanical-draft cooling tower and $403/kW for a natural-draft cooling tower.
b The Crystal plant has both fossil-fuel and nuclear units. IfFPC installed a cooling tower, it would put it on the two fossil-fuel units or on the nuclear unit, but not both. It would most likely select the fossil-fuel units for the retrofit, so this plant is included on the list of fossil-fuel plants.
c Cooling towers cannot be installed at the Encina plant. Costs shown are for installing an offshore outfall pipe to deep water.
d Commonwealth Edison did not make independent cost estimates for its plants, Instead, it used the cost figures for a cooling tower installed at its Byron plant in 1976 as a new installation. These costs were scaled up to approximate retrofit costs.

Source: Veil (1993)

Table 4 -Summary of Retrofitting Costs for Nuclear Units
Cost to Retrofit

Company	Plant	Fuel	Power (MW)	Mills.Of 1992 $	$/kW
GPU Nuclear	Oyster Creek	Nuclear	640	150	234
Virginia Power Co	North Anna	Nuclear	1618	326	201
Virginia Power Co.	Surry	Nuclear	1562	335	214
Carolina P&L	Brunswick	Nuclear	1642	168	102
Southern Calif. Edison	Songs	Nuclear	2200	307	139

Amer. Electric Power <sup>a	Cook	Nuclear	2110	485	230
Comm. Edison <sup>b	Dresden	Nuclear	1666	180	108
Total			11438	1951	
Overall Average					171

aAmerican Electric Power did not prepare an independent cost estimate for the Cook plant. Instead it used the cost rate for nuclear plants reported in Stone & Webster (1992).

b Commonwealth Edison did not make independent cost estimates for its plants. Instead, they used the cost figures for a cooling tower installed at its Byron plant in 1976 as a new installation. These costs were scaled up to approximate retrofit costs.
Source: Veil 1993

EPA Response

EPA disagrees with the conclusions and analysis presented by the commenter. EPA outlines the major points of contention below.

Counterpoints to the data and supporting analysis of Table 3:

1. The commenter's analysis of retrofit costs assumes that each facility would necessarily replace the entire surface condenser when upgrading from a once-through to cooling tower system. Additionally, the commenter assumes that the plant, in the process of retrofitting the cooling system at an existing plant, would need to replace piping, valves, and pumps of the cooling system. These assumptions are invalid for evaluating new "greenfield" facilities and fall outside the range of appropriate costs of this rule. Modern condenser's for once-through and closed-cycle cooling systems are essentially identical in cost. Therefore, new power plants changing design from a once-through to recirculating system would incur no costs for surface condenser design changes. This amounts to an enormous overestimation of capital costs by the commenter with respect to new facilities. Surface condensers, piping, valves and pumps have installed capital costs that approach the costs of cooling towers at some plants. In this case, it is likely that the commenter has overestimated the appropriate capital costs by a factor of two (2) due to this fact alone.

2. The commenter's data include one-time capital costs for obtaining federal, state, and local permits, including the cost of environmental impact studies. It is unclear what percentage of the capital costs presented by the commenter are due to the "start-up" costs. Therefore, inclusion of these "start-up" costs in cost estimates for this new facility rule has an unknown effect on capital costs estimates presented by the commenter.

3. The commenter includes replacement power losses (for when plants are shut down for retrofitting activities beyond routine maintenance outages) as a capital cost component for the majority

of plants in Table 3 of the comment. This represents yet another instance where costs not attributable to new facility construction or changes in design are included by inference in the commenters comparison analysis. EPA notes that the percent retrofit estimate outlined in point 7 below does not include these replacement power costs. Again, it is unclear what percentage of the capital costs presented by the commenter are due to the replacement power costs. Any inclusion of these costs for this rule would directly result in overestimation of capital costs.

4. The capital costs for New England Power's (NEP) Manchester Street Station include $25 million (1992 dollars) for the construction of a desalination plant. EPA contests the need for a desalination plant at this location, despite the assertions made by NEP that it would have been necessary due to a lack of a source for freshwater. EPA notes that many alternatives to desalination exist for make-up water supplies in cooling towers. For instance, treated wastewater effluent is a possible solution in urban areas, as is decreased cycles of concentration within the tower, leading to a larger tower design and a more frequent blow-down from the tower. Presuming that the final water source available would be of a high salinity, it is likely that the level of recirculation could approach the low end of the facilities costed to meet EPA's flow reduction requirements for the final rule. Regardless of the plant's final decision, EPA contends that a desalination plant capital cost is clearly not representative of the costs of this rule. However, EPA acknowledges that the design costs of a plant using more make-up water and fewer cycles of concentration would be greater than those estimated for the tower portion of Manchester Street's estimated retrofit. Therefore, EPA conservatively estimates that of the $ 13.6 million (1992 dollars) attributable to the cooling tower for the Manchester Street station, a 30 percent increase the final adjusted cost would be conservative for estimating the cooling tower capital costs.

5. Pacific Gas & Electric's Pittsburg Plant (Unit 7) was retrofitted for mechanical draft cooling towers in 1976. The cost was $16.3 million (1976 dollars). The commenter excluded this estimate from their analysis for the reason that the retrofit job did not involve replacement of existing condenser and conduit system. For this precise reason, EPA includes this real-life cost example as a testament to the errors committed in the commenter's analysis when comparing to realistic new-facility costs. Converting the installed capital cost of the cooling tower to 1992 dollars gives $34 million for a 740 MW coal-fired plant. This is a retrofit installation of the type similar to that EPA envisioned when estimating the 30 percent factor for developing costs for the experts meeting. Therefore, removing these retrofit costs, scaling to 1999 dollars, converting from concrete to redwood costs, and dividing by the energy capacity of the plant gives a final ratio of $35/kW (in 1999 dollars). Compared to the estimate of the commenter for a hypothetical retrofit situation at Pittsburg's remaining 1300 MW of capacity (the commenter estimated a retrofit installation, in 1999 dollars, of $122/kW), the final, installed, real-life cost of $35/kW is especially enlightening as to the degree to which the commenter has overstated costs elsewhere.

6. The commenter excludes other real-life cost data included in its supporting documentation that would demonstrate further the systematic overestimation of costs on its behalf. Commonwealth Edison's Byron station was built anew in 1976 with a cooling tower. The cost of the tower for the 2350-MW station was $74.5 million (in 1976 dollars). Converting this to 1999 dollars, dividing by the energy capacity, and adjusting for material of construction gives a new facility cooling tower cost of $35/kW. This value is similar to that from the omitted Pittsburg plant, as discussed in point 5, above.

7. EPA estimates retrofitting a cooling tower to an existing facility will cost approximately 30 percent more than for a new "greenfield" facility. The value quoted by DOE of 20 percent was from very preliminary information supplied by EPA and is not appropriate, based on EPA's current estimates. The 30 percent value was presented by EPA at the "Experts Meeting." EPA considers this value, which EPA received from multiple consultations with cooling tower vendors, as more representative. However, EPA notes that this cost is not inclusive of the costs to replace power lost when a plant is shut down for retrofitting activities beyond the routine maintenance outage period. Additionally, in the supporting documentation provided by the commenter (Veil 1993), the commenter references a retrofit estimate of 70 percent. EPA did not have documentation to determine the basis but believes that the commenters use of 20 percent as a retrofit scaling factor deviates from its own 70 percent value. In fact, the commenter incorporates data from the Commonwealth Edison's Kincaid Plant acknowledging that it had been scaled by the additional 70 percent retrofit value.

8. There are two clear outliers in the capital cost data presented by the commenter. Generally, the data center about the mean. However, Pepco's Chalk Point and Florida Power Company's Crystal River plants are dramatic outliers. Each data point for these plants lies far above two standard deviations from the mean. No other data point lies above one-half of a standard deviation above the mean. Hence, it is inappropriate to include these data points in an analysis to determine an average cost of an installation when they are clear outliers to the approximately 30 other grouped data points. The commenter also includes in its analysis data from San Diego G&E's Encina plant which is not representative of a cooling tower installation, but, rather, a cooling intake piping extension. It is inappropriate to include this information in the analysis.

9. EPA's rule of thumb estimates for calculating the capital cost of installed cooling towers at new facilities ranges from $56/gpm to $68/gpm (average $62/gpm) for the final rule for the median cost construction material. See Chapter 2 of the Technical Development Document for a discussion of the final cost estimates for cooling towers, which EPA deems as the most appropriate costing basis for new facilities.

10. In some cases, the data points for plants with capacities greater than 600 MW represent natural draft type cooling towers, as opposed to mechanical draft. Although these types of towers may be economically practicable for some large plants, they are much higher in capital costs than mechanical draft towers. The commenter acknowledges this fact when quoting another cost study projecting capital costs for separate mechanical and natural draft towers. Therefore, when comparing only capital costs developed by EPA and those presented by the commenter, it is improper to include those costs from natural draft towers to the costs of mechanical draft towers. Additionally, as EPA discovered during its data collection process for this rule, the vast majority of recently constructed cooling towers at facilities similar to those within the scope of this rule are of the mechanical draft type.

11. The material of construction for these hypothetical retrofit plants was not declared in the supporting documentation provided by the commenter. It is probable that concrete could have been used as the material of construction for some of the cooling tower cost estimates. This material is not currently representative of national cost estimates for new facilities, as the standard cooling tower installation for recently constructed facilities is fiberglass. The cost of installation of fiberglass is just slightly (negligibly) lower than the cost of redwood material, which EPA based its cost estimates on

for the proposal and final rule. The cost of concrete exceeds that of the standard material cost of modern towers by approximately 25 percent. In addition to the material of construction, the commenter's supporting documentation does not describe the pertinent design parameter of "approach," which can influence the cost of the cooling tower capital costs significantly.

12. The commenter makes two mathematical errors in their calculation of dollar per kW in Table 3 and in their final calculation of dollars per gpm (after removing retrofit costs). Without factoring out the influence of the outliers and other dissimilar data points (as explained above) the overall average of the data points presented by the commenter in Table 3 is $105 per kW, not $108/kW. Also, removing a hypothetical retrofit cost of 20 percent (which EPA does not support, see point 1 above) would reduce the commenter's asserted dollar per gpm ratio for fossil fuel plants from $300/gpm to $240/gpm. The commenter incorrectly states that their final "greenfield" estimate is calculated as $250/gpm.

Considering the many points made above, a realistic, adjusted "greenfield" ratio of costs to electricity generation for the fossil fuel plants presented by the commenter would be much closer to $34/kW (in 1999 dollars) rather than the $131/kW value asserted in the comment. The estimate of $250/gpm asserted by the commenter as a comparison to EPA's rule of thumb values should in fact be estimated much closer to $77/gpm.

Conclusion:
EPA's estimates of cooling tower capital costs at new plants, are between 13 and 24 percent less (on a rule-of-thumb basis) than those presented by the commenter (after adjustment to correct several of the quantified problems discussed above). However, there are other overestimations that EPA was unable to quantify and these plausibly explain the percent difference in the costs. In addition, the age of the costing estimates presented by the commenter may contribute to higher capital costs. EPA learned during its data collection period for this rule that cooling tower installation costs have steadily decreased with time.

The TDD presents EPA's detailed analysis documenting the calculations and counterpoints made by EPA in this response with regards to the data in Table 3.

Stone & Webster provided a breakdown of the capital costs in Table II of their study. Of these costs, only $9.2 million (in 1992 dollars) would be attributable to a typical new facility cooling tower installation. The balance of the costs are all associated with the retrofit and other activities listed below in points 1 through 7.

1. The Stone & Webster study estimates that demolition of all or part of existing plant structures (those not associated with cooling systems) and construction of new structures (not to be confused with cooling water intake structures) in new locations will sometimes be necessary.

2. Replacement of condenser water boxes and significant modification of the condenser design is assumed.

3. The existing piping, cables, and other buried components would be removed and replaced with

new materials in different locations for some cases.

4. Stone & Webster assumed that some intake and discharge structures would need to be removed, demolished, or capped off.

5. The study assumed that piping runs to and from the condenser carrying cooling water would be subject to many "interference problems," but did not specify what these would cost, except to say that "hydraulic requirements would be greater due to the longer length of piping retrofit."

6. The study includes costs for material and labor for demolition and modification to existing equipment.

7. The costs of contingencies were assumed at 15 percent. This value is not appropriate for new facility construction, as explained in 316bNFR.039.039. Ten percent, as used by EPA in its final cost estimates, is more applicable for the case of new power plants.

Scaled to 1999 dollars and converted to a per generation capacity ratio, a more reasonable new facility estimate for Stone & Webster's data would be $37/kW. This is roughly equivalent to the values calculated above for the corrected commenter's data. This value still exceeds EPA's estimates slightly, but only by a comparable value to those discussed above. Bear in mind that the design approach for the towers modeled by Stone & Webster exceeds that of the design values estimated by EPA for national costs. The design approach for the tower was 9 deg F and the range 25 deg F, which would increase capital cost compared to the estimates used by EPA. In addition, the age of the costing estimates (1976) may contribute to an overestimation of capital costs for today's construction techniques and the mature state of the technology.

Comment ID 316bNFR.039.039

Subject Matter Code	24.2
EEA - Estimation of Unit Costs	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Contingencies

On page AppA-8, EPA notes that contingency costs average 10 percent. This value may be low, as the book, Basic Cost Engineering, Third Edition (1996), states on page 75, "If much is left to the estimator's discretion, use a 15 percent contingency."

EPA Response

Anticipated projects within the scope of this rule will involve "greenfield" construction. Because of this fact, the Agency concludes that the contingency cost allowance should be more typical of new construction costing than retrofit costing for which a higher contingency cost allowance may be justified. EPA concludes that a 10 percent contingency allowance is appropriate. As stated in Plant Design and Economics for Chemical Engineers, 4th Ed. (Peters and Timmerhaus, 1991), "contingency factors ranging from 5 to 15 percent…are commonly used, with 8 percent being considered a fair average value." Therefore, EPA's choice of 10 percent is above the "fair average value."

Comment ID 316bNFR.039.040

Subject Matter Code	24.2
EEA - Estimation of Unit Costs	

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Organization U.S. Dept. of Energy

Site Preparation Costs

The first paragraph on page AppA-33 states that "for costing purposes it is assumed that site preparation costs increase at a rate of an additional 25 percent per depth factor...". The explanation of why a factor of 25 percent was assumed is not provided in the text. In general, it should be possible to estimate the effect of well depth on installation cost, using available unit costs from references such as Heavy Construction Cost Data 1998 (R.S. Means 1997b) and other cost estimating references. It is not clear why an assumption was made and it would be helpful if the text indicates why cost estimating references were not used.

EPA Response

The 25 percent factor was used to account for additional costs for working at greater depths (e.g., use of divers, etc). This factor is applied on top of the increase in cost that corresponds to physical increase in structure and component size. The cost references referred to by the commenter do not provide guidance of this type.

Comment ID 316bNFR.039.041

Subject Matter Code	24.2
EEA - Estimation of Unit Costs	

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Organization U.S. Dept. of Energy

Cost Assumptions

Estimation of capital costs in this document, on many occasions, makes use of assumptions which are not cited or defended. The following is a partial list of cost assumptions which appear to have a major impact on the estimated costs:

-page AppA-16 -installation costs of cooling towers are 80 percent of cooling tower equipment cost;

-page AppA-27 -capital cost of passive screens are 60 percent of the capital cost of a basic traveling screen of similar size;

-page AppA-29 -equipment cost for a velocity cap is 25 percent of the velocity cap installation cost;

-page AppA-40 -costs of fish handling equipment and installation are 75 percent of the underwater installation cost.

The report that serves as the basis for Appendix A, SAIC (2000), notes in its introduction that Best Professional Judgment (BPI) is used in some cases to substantiate a number of the above assumptions. The second-to-last sentence on page 1 of SAIC (2000) indicates that the authors believe the "cost estimates are preliminary level cost estimates (at a ± 25 percent accuracy)" although this analysis makes use of a fairly large number of assumptions. It may be advisable for the authors to perform a sensitivity analysis around the major assumptions to establish whether the ± 25 percent accuracy level is maintained, and if not, revise the level of accuracy shown on page 1.

EPA Response

The items disputed by the commenter, in general, are supported either by discussion with industry representatives or are based on best professional judgment, or both. In the end, EPA verified the resulting total cost estimates compared to actual empirical cost data.

The proposal EEA states that the following items are based on discussions with industry representatives. For the final rule, the references have been included in the confidential business information record, where applicable.

•Page AppA-16 : tower installation = 80% of equipment.

•Page AppA-27 : Capital costs of passive screens = 60% of traveling screens of similar size.

EPA notes that the commenter provides no counter examples or data. The proposal EEA states that the following items are based on best professional judgment. The record for the final rule also

documents input from discussion with industry representatives.

•Page App-29 : equipment cost of velocity cap is 25% of installation. The EEA also notes that this is considered as conservative.

•Page App-40 : cost of fish handling equipment and installation are 75% of underwater installation costs.

EPA notes that the commenter provides no counter examples or data. The statement that EPA views the costs to be within plus or minus 25 percent is born out by the comparison to actual empirical data. Chapter 2 of the Technical Development Document presents a graphical representation (titled, "Actual Capital Costs for Wet Cooling Tower Projects and Comparable Costs from EPA Cost Curves") of the EPA estimated cooling tower capital costs as compared to actual cooling tower costs, with error bars showing the upper and lower boundaries of the plus or minus 25 percent range for the estimated costs.

To verify its cooling tower capital cost estimates, EPA compared capital cost estimates derived from EPA's cost equations to actual installed turn-key costs for a large number of recent cooling tower construction projects. These installed turnkey costs generally included all major components of cooling tower construction at installation. Where certain components (such as pumps or basins) were not included, EPA adjusted the project costs to account for these components. Based on this comparison, EPA found its cooling tower capital cost estimates to be accurate, or in some cases, to slightly overestimate capital costs. In addition, EPA tested its costs estimates against two standards of accuracy found in capital cost contingency guidance developed by the American Association of Cost Engineers International (AACE 1996). EPA found that its cost estimates passed both tests and are therefore accurate at the level recommended for budget estimates.

The selection of plus or minus 25 percent as a measure of reasonable accuracy is not based upon the methodology, but rather it is based upon capital cost contingency guidance provided by the American Association of Cost Engineers International (AACE 1996). The AACE guidance describes different stages of cost estimate development. For the first stage, “order of magnitude estimates, ” AACE suggests that an accuracy of +50 percent to -30 percent is acceptable. The stated purpose of “order of magnitude estimates” is for proposed projects (economics of size) and for evaluating alternate process schemes. The purpose of the regulatory impact analysis appears to fit the purpose of “order of magnitude” estimates by AACE standards.

For the next accuracy level, “budget estimates,” AACE suggests that an accuracy of +30 percent to -15 percent is acceptable. The stated purpose of “budget estimates” is to commit engineering budget, to commit purchase of critical delivery equipment, appropriation requests, and checking bids. The fact that EPA views the compliance cost estimates to be within +25% to -25%, which nearly meets the acceptable accuracy of “budget estimates” when an “order of magnitude” estimate would be reasonable, indicates that the cost estimates reflect a greater accuracy than is necessary. This accuracy is primarily the result of close consultation with vendors and industry representatives.

References:

AACE. “Certification Study Guide” American Association of Cost Engineers International.

Morgantown, WV. Interim Release - May 1996.

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Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 24.2

EEA - Estimation of Unit Costs

Fish Spray Pumps

Table A-26 provides two equations for estimating the capital costs of fish spray pumps, which differ in whether a third-order term is present. The book, Plant Design and Economics for Chemical Engineers (Peters & Timmerhaus, 1968) indicates that a power law representation of the capital cost of centrifugal pumps would be more appropriate. Figure 4 {see attachment 316bNFR039_Figures} provides correlation of capital cost data for centrifugal pumps (horizontal, split-case, single-stage) taken from page 522 of the U .S. Army Corp of Engineer's Unit Price Book 2000, Volume I. We suggest that EPA consider this already-published costing equation.

EPA Response

Rather than use the cost estimation sources cited by the commenter, EPA used actual costs corresponding to different flows cited by vendors as the basis for the cost equations. The type of equation selected was based on the data fit as measured by the R2 value. EPA believes that where possible, use of vendor or industry supplied data provides a more relevant cost estimate than the use of outdated or non-specific models. The commenter provided no data to suggest that EPA's method is not accurate in this context.

Comment ID 316bNFR.039.043

Author Name Robert S. Kripowicz
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Subject Matter Code 21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule

Cooling Tower Installation Costs

Page AppA-16 of the report notes that "Based on discussions with industry representatives, EPA estimated installation costs as 80 percent of cooling tower equipment cost." It is unclear why alternative sources of cost data, such as the U.S. Army Corps of Engineers' Unit Price Book 2000 were not applied. The assumption that installation is 80 percent of equipment cost may not be valid and may lead to excessively high capital costs. Table 5 <listed below> provides capital cost data for centrifugal-type, packaged unit cooling towers based upon the above-cited reference.

Table 5- Capital Cost of Centrifugal-Type Cooling Towers, Packaged Units

Heat Rejection (tons)	Ton-Btu/hr	Range (<deg>F)	Flow (gpm)	Capital Cost ($)
50	12,000	10	1200	6800
75	12,000	10	1800	8900
100	12,000	10	2400	10600
200	12,000	10	4800	16500
300	12,000	10	7200	22900
400	12,000	10	9600	27200
500	12,000	10	12000	34900
600	12,000	10	14400	39600
700	12,000	10	16800	51100
800	12,000	10	19200	59000
900	12,000	10	21600	66000
1,000	12,000	10	24000	69400

Source: Page 571 of Unit Price Book 2000, Volume I, U.S. Anny Corps of Engineers, Huntsville, AL {March I, 2000).

EPA Response

EPA considers the scaling factor of 80 percent to be conservative for estimation of the final installed capital costs of cooling tower equipment. EPA's cost estimates have been empirically verified against real-life, turn-key costs from vendors and show only slightly higher average results, not excessively high capital costs, as the commenter suggests. See Chapter 2 of the Technical Development Document.

EPA appreciates the costing data provided by the commenter. However, EPA notes that the data provided by the commenter appears to be for capital costs of equipment and questions whether or not

they represent installed costs and the costs of essential components such as pumps, basins, electrical, etc.

Additionally, the data presented by the commenter represents cooling towers of a much smaller size than those estimated in EPA's analysis. For example, the smallest cooling tower in EPA's analysis is for a 64 MGD (or 44,300 gpm) cooling tower. The largest model in the data presented by the commenter is 24,000 gpm.

This comment asserts that EPA has significantly overestimated the capital costs of cooling towers. EPA disagrees and considers the final rule's empirically verified costing estimates to represent accurate, real-life costs of installed cooling tower systems. Other comments received on this subject assert the opposite point of this comment, including others made by the same organization as the commenter: DOE.

Comment ID 316bNFR.039.044

Subject Matter Code	24.2
EEA - Estimation of Unit Costs	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

On page AppA-18, EPA outlines the components considered for annual O&M costs of cooling towers. However, every cooling tower requires at least one pump to deliver water, with the pump horsepower estimated by multiplying the water flow rate (in gpm) by 0.012. Also, many cooling towers have a fan motor to blow air over the water to encourage moisture laden air to exit and be replaced with new air that is better able to accept more vapor. The cost of electricity for these two components do not appear to have been included within the annual O&M cost and should be considered for inclusion.

On page 1 of SAIC (2000), the report states that "Where possible, SAIC developed unit technology costs." The footnote at the bottom of page 1 states that "Capital and O&M costs used for regulatory impact analysis can be expressed on a unit basis (e.g., $/gallons per minute of cooling water...)". However, a review of this document, which serves as the basis for Appendix A, does not indicate that unit costs were developed, or provide information as to how unit costs could be developed (such as assumed duration of operations, operating life, discount rate, etc.). In fact, the correlation of the capital and annual O&M costs of the various cooling water intake systems in this document followed a much different trend, in that very detailed cost correlations were developed. These cost correlations showed a highly nonlinear dependence on operating variables such as water flow rate and well depth, invalidating the hypothesis of a unit cost.

Unit costs appear to be applied in Appendix B, but there does not appear to be any method by which to establish whether these unit costs agree with the capital and annual O&M costs. We recommend that EPA include a section indicating how unit costs were developed, providing detail on any assumptions that may have been made.

EPA Response

Regarding Page App A - 18 of the Proposal EEA:

In estimating annual O&M costs for cooling towers, EPA used cost factors provided by industry representatives. These cost factors represent an aggregation of many O&M components, including the energy costs.

Regarding Page 1 (SAIC 2000):

The commenter is correct that the EPA cost estimates are based upon equations developed using detailed cost correlations rather than being expressed as unit technology costs. The statement at proposal was intended to note that unit cost estimates were generally used in the development of components that went into the detailed aggregate technology costs. The commenter does not appear to question the cost methodology so much as the description of it as being based on unit technology costs.

Concerning Appendix B, the commenter appears to be confused by the terminology. In this context, unit costs refers to the approach of developing facility costs that are representative of a certain subset of the universe of facilities that would be impacted. Such subsets can include ranges of flow and site-specific attributes such as types of water bodies. Such unit costs are then used as the basis for extrapolating costs to the entire universe of potentially impacted facilities.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Dennis J. Dunning

On Behalf Of:

New York Power Authority

Author ID Number:

316bNFR.040

Comment ID 316bNFR.040.001

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Dennis J. Dunning

Organization New York Power Authority

Logic dictates that a clear definition of adverse environmental impact is needed before rules can be developed to minimize that impact. However, the proposed rules (on page 49074, column 2, first full paragraph, lines 11-14) state:

The regulatory language in today's proposed rulemaking does not include a definition of adverse environmental impact.

Based on this statement, at least two conclusions can be drawn. One conclusion is that the statement is accurate. If so, the proposed rules have no logical basis. Another conclusion is that the statement is inaccurate. If so, the statement could mean that the regulatory language in the proposed rulemaking includes a conceptual, rather than a realistic, definition of adverse environmental impact and that the EPA used a conceptual definition in developing the proposed rules. EPA should clarify this point.

EPA Response

Please see response to comment 316bNFR.009.001.

Comment ID 316bNFR.040.002

Subject Matter Code	9.41
Current Agency Interpretation of AEI	

Author Name Dennis J. Dunning

Organization New York Power Authority

On page 49074, column 2, second full paragraph, lines 9-18) the proposed rules state:

EPA conceptualized adverse environmental impact in a manner that would not characterize the threshold for being considered "adverse" as the impingement or entrainment of a single organism, but also would not result in a threshold that is so high that it would allow for the impingement or entrainment of millions of organisms, larvae, or eggs.

EPA did not provide the conceptual basis for concluding that impingement or entrainment of millions or organisms, larvae, or eggs constitutes an adverse environmental impact. EPA should explain how this conclusion was reached.

EPA Response

Sections III and VI.B of the preamble for today's rule cite numerous studies and reports that document the substantial numbers of fish and shellfish that can be lost through impingement and/or entrainment. Concern over these losses has been expressed by federal resource management agencies, states, fishing commissions, environmental groups, and individuals. In contrast, industry groups and their representatives contend that despite these losses, there are few if any demonstrable adverse effects to fish populations or aquatic communities that can be directly linked with cooling water intake withdrawals.

In section VI.B. of the preamble, EPA expressed concern over the methods used by industry to arrive at the conclusion that intakes cause no adverse environmental impacts (e.g., use of population models, estimation of compensatory abilities of fish populations, de-emphasis of impacts on forage species, and limited attention to the potential for cumulative impacts from multiple intakes). EPA also expressed concern over the long-term effects of overfishing and the potential for fish and shellfish resources to be exposed to multiple stressors. This holistic perspective as documented in the preamble provides the conceptual basis for EPA's conclusion that impingement and/or entrainment of millions organisms (inclusive of all life stages) constitutes an adverse environmental impact in and of itself. EPA does not believe the statute compels EPA to limit the interpretation of adverse environmental impact to demonstrated population impacts and in fact such an approach has limitations in the context of new facility permitting.

Comment ID 316bNFR.040.003

Subject Matter Code	9.41
Current Agency Interpretation of AEI	

Author Name Dennis J. Dunning

Organization New York Power Authority

On page 49074, column 2, second full, lines 18-22 the proposed rules state:

Thus, EPA considered adverse environmental impact as a level of impingement or entrainment of aquatic organisms that is recurring and nontrivial.

EPA did not provide a definition of “nontrivial”. The mathematical definition of “trivial” according to Webster’s Ninth New Collegiate Dictionary is “characterized by having all values equal to zero”. If EPA used the word “nontrivial” to mean the impingement or entrainment of less than millions of organisms, larvae, or eggs, it should indicate how it arrived at that answer.

EPA Response

Under today's rule, EPA has interpreted AEI to include impingement and entrainment. For the purposes of today's rule for new facilities, AEI includes impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population’s potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.).

Comment ID 316bNFR.040.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Dennis J. Dunning

Organization New York Power Authority

The words “adverse” and “nontrivial” as used in EPA’s conceptualization of adverse environmental impact, both require value judgements and consideration of multiple factors. For example, the proposed rules indicate that cost is a factor (Page 49094, second column, paragraph C) as well as the number of aquatic organisms impinged or entrained. Thus, it is unrealistic to believe that a universal, scientific definition of adverse environmental impact will be developed because scientific judgments should not reflect value judgments. A more realistic approach for balancing multiple factors and defining adverse environmental impact is that found in the EPA Guidelines for Ecological Risk Assessment. Based on the Federal Register, Volume 63, No. 93, page 26846:

Ecological risk assessment “evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors” (U.S. EPA, 1992a). It is a flexible process for organizing and analyzing data, information, assumptions, and uncertainties to evaluate the likelihood of adverse ecological effects. Ecological risk assessment provides a critical element for environmental decision making by giving risk managers an approach for considering available scientific information along with the other factors they need to consider (e.g., social, legal, political, or economic) in selecting a course of action.”

EPA should explain the extent to which it considered using its Guidelines for Ecological Risk Assessment and why they were not adopted for use in the Regulations Addressing Cooling Water Intake Structures for New Facilities.

EPA Response

Please see response to comment 316bNFR.029.013. EPA did consider and apply ecological risk assessment concepts when developing today's interpretation of AEI. Specific ecological endpoints that were considered included individuals, populations, and communities.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Lynne H. Church

On Behalf Of:

Electric Power Supply Assn. (EPSA)

Author ID Number:

316bNFR.041

Comment ID 316bNFR.041.001

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

EPSA's comments highlight the merchant power industry's concerns about the impact that this rulemaking could have on the schedule and cost to develop new generating facilities, the collateral environmental impacts that would result from application of these rules, and the scientific and cost basis on which this rulemaking relies.

EPSA believes that this proposed rule goes too far in its attempt to address potential aquatic ecosystem impacts, while failing to consider that air quality, electricity reliability, energy conservation and competition in the electricity industry will all suffer as a result. These collateral impacts could be significant. We are concerned that the proposed 316(b) rule reflects a lack of consideration of these issues during its development and a lack of means to address these issues in connection with the permitting of new facilities.

In addition, we believe that EPA has significantly underestimated the cost of complying with this regulation.

EPA Response

With respect to the commenters' concern about the impact this rulemaking may have on the schedule for developing new facilities EPA believes that the two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities (Track I) with the goal of also allowing flexibility by including a performance-based alternative (Track II). Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays.

With respect to the cost vs benefits concern EPA believes that the two-track approach represents the best technology available for minimizing adverse environmental impact. EPA believes this approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while determining best technology available specific to site conditions.

For the final rule, EPA presented estimates of marginal annual increases in air emissions associated with installation recirculating wet cooling towers in lieu of once-through cooling systems. The Agency compared projected emissions under the rule to projected emissions absent the rule. See Section IV.B and VI.B of the final rule. For the other regulatory options analyzed for the final rule, EPA presented annual air emissions estimates in the Technical Development Document. EPA did take energy penalties into account in conducting the economic analysis.

EPA received many good comments regarding the cost estimations presented in the proposed rule. Section VI. H of today's rule addresses specific comments raised regarding EPA's consideration of facility level costs. EPA's revised Economic Analysis adjusts the total estimated annualized

compliance costs of today's final rule to $47 million. Further discussion on the Economic Analysis is presented in Section VIII of the final rule.

Comment ID 316bNFR.041.002

Subject Matter Code	22.1
CWIS Impacts and Benefits	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Impacts on Competitive Markets and the Environment

New plants represent the future of the electricity generation industry. Using primarily natural gas fuel and efficient generating technologies, new merchant plants are expected to gradually displace many of the older generating stations that are currently operating. These new power plants are being developed by merchant generating companies who have responded to the introduction of competition into the electricity industry by bringing new, clean, innovative technologies to the marketplace. Merchant generating companies are also making significant investments in lowering emissions and upgrading older plants that have the potential to remain viable in the competitive marketplace. Several aspects of the proposed 316(b) regulation will have a chilling effect on the development of clean, new power plants, with substantial negative effects to air quality, fuel efficiency, the advancement of power generation technology, and potentially electricity reliability.

EPSA supports an approach to the regulation of CWIS that encourages the development of cleaner, more efficient technologies. However, in making this proposal, it appears that EPA has not taken into account the likely environmental impacts that will result if the 316(b) regulations become a barrier to new merchant plant development.

These impacts could well compromise the environmental benefits sought through this rule, in four ways. First, the nature and extent of the studies that EPA proposes to require will significantly affect the permitting schedule and cost of siting new, clean generating facilities. Second, the imposition of project site and technology constraints will affect project cost and limit the availability of appropriate sites. Third, these development cycle and siting impacts raise reliability and energy security concerns, as they challenge developers' abilities to add needed generating capacity to serve growing electricity demand. Fourth, the environmental and efficiency impacts associated with increasing internal power requirements to operate advanced (particularly dry) cooling systems will affect project economics and overall viability.

Individually and collectively, these effects will result in continuing reliance on older power plants to serve capacity and energy needs, increased air emissions when compared to those that would be experienced if the new plants could be sited and permitted quickly, and high costs to developers in dollars and efficiency that could thwart new projects altogether. Generally, we believe that these effects would compromise and possibly exceed the aquatic ecosystem benefits that this rule seeks to achieve. Each of these issues is discussed below in greater detail.

Finally, EPSA is concerned that EPA's cost estimates generally underscore the agency's limited insight into (and concern for) the competitive market context of this rulemaking. EPSA is very concerned that EPA has severely underestimated the number of new units that will be affected by this rule, their likely cost of compliance, and the resulting implications for the development of new generating capacity. These concerns are discussed below in a separate section ("estimation of cost of the rule").

EPA Response

The commenter claims EPA has not taken into account the likely environmental impacts that will result if the 316(b) regulations become a barrier to new merchant plant development. The commenter cites four main ways in which the rule would compromise the environmental benefits sought through this rule:

(1)The nature and extent of the studies that EPA proposes to require will significantly affect the permitting schedule and cost of siting new, clean generating facilities.
(2)The imposition of project site and technology constraints will affect project cost and limit the availability of appropriate sites.
(3)The development cycle and siting impacts raise reliability and energy security concerns.
(4)The environmental and efficiency impacts associated with increasing internal power requirements to operate advanced (particularly dry) cooling systems will affect project economics and overall viability.

EPA disagrees with the commenter's claims. EPA's response to each point:

(1)In response to concerns about the timely siting of future generation capacity, EPA has designed the final section 316(b) New Facility Rule to allow for expedited permitting. The two track approach allows facilities to avoid lengthy pre-operational study requirements, as are common under the current site-specific implementation, by complying with the requirements of Track I. Please refer to the response to comments 316bNFR.512.003 (comment category 23.6) and 316bNFR.524.085 (comment category 21.4). In addition, EPA's analyses have shown that the incremental costs of this rule are low. This rule is economically practicable and will not have economic impacts on the large majority of new electric generators. See the preamble to this final rule and Chapters 6 and 7 of the Economic Analysis document.
(2)The final section 316(b) New Facility Rule does not contain any requirements or provisions that would restrict a facility's choice of sites. EPA has determined that the requirements of the final rule will not adversely affect electric facility siting. For more information, see EPA's response to comments 316bNFR.014.023 above.
(3)Based on the analyses in support of this rule, EPA has determined that the requirements of the final rule will not adversely affect energy supply. For more information, see EPA's response to comments 316bNFR.014.023 above and 316bNFR.512.003 (comment category 23.6), and Chapter 9: Other Economic Analyses.
(4)EPA estimated that the additional internal power requirements of the final rule are low. In fact, 97 percent of all new combined-cycle facilities and 71 percent of all new in-scope coal facilities will already install a cooling tower in the baseline and will not have significant additional power requirements. At the small number of new facilities that would not have installed a wet cooling tower but for this rule, EPA calculated the "energy penalty" and incorporated those penalties into the cost estimates for the rule. These estimates and their effects are discussed in the Technical Support Document and Economic Analysis. EPA therefore believes that this rule will not affect project economics and overall viability.

In addition, the commenter claims that EPA has severely underestimated the number of new units that will be affected by this rule and their likely cost of compliance. For a response, see comment 316bNFR.042.003 in category 8.1 and the discussion of changes made to EPA's estimate of the number of in-scope facilities and their costs in the preamble to this final rule.

Comment ID 316bNFR.041.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Impacts on the Development of New, Environmentally Beneficial Plants

From the process and planning perspectives, EPA has not considered the practical realities of siting new generating facilities. Siting decisions are made based upon many complex, interrelated procedural and planning activities, only one aspect of which relates to CWIS. Other decisions relate to fuel and site contracts, zoning and other local issues, market forecasts, financial and insurance arrangements, community concerns, taxation issues, as well as compliance with many other environmental (particularly air emission) requirements, among others.

Despite the number and complexity of activities involved in developing a plant, competitive electricity market realities dictate that market-responsive facilities be developed on short schedules. Developers have managed to reduce the development cycle for new plants to as short as 16 months because timeliness is key to projects' transmission interconnections, contract compliance, availability to support peak demand, among other critical activities. However, the studies that EPA proposes to require would seriously extend projects' development cycles, in many cases precluding their market-responsiveness and threatening their viability. EPA's proposed requirement to conduct sampling for at least one year prior to submittal of a permit application, for example, in combination with other requirements, could have significant project-development schedule impacts with implications for the competitiveness of the plant.

Clearly, the rule will need to serve its environmental objectives while being workable in the market context in which affected facilities operate. EPSA is extremely concerned that EPA's failure to consider project development impacts compromises the effectiveness and appropriateness of the proposal.

EPA Response

EPA has adopted a two-Track approach and has simplified the information requirements in track I to address concerns such as those raised by the commenter. EPA agrees that there are a number of factors that go into the decision making process of siting a new generating facility. However, EPA has examine the potential siting implications of today's rule for new facilities and has found that facilities have a great degree of flexibility in their siting, in how their cooling water intake structures are otherwise located, and in the design, construction, and sizing of the intake structure.

EPA recognizes the importance of quick decisions and the desire for short construction schedules. For these reasons, the final rule establishes technology-based performance requirements, based on a two-track approach. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays.

In particular, EPA deleted the requirement under the final rule, requiring one year of source water sampling prior to submitting an application for an NPDES permit.

Comment ID 316bNFR.041.004

Subject Matter Code	22.1
CWIS Impacts and Benefits	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Impacts on Site/Technology Selection

The rule's implications for site and technology selection may constrain developers' options for pursuing new merchant capacity. This may discourage new, clean and more efficient plants, which have demonstrated environmental benefits, from being built. EPSA is also very concerned that such requirements would introduce considerable uncertainty as to what technology and/or performance requirements were applicable to any given project, further threatening capacity development plans.

Cogeneration units offer a good example of a type of generating plant whose siting options could well be affected by the proposed rule.<FN 1> As cogeneration units are associated with industrial facilities, section 316(b) location requirements for intake structures could limit appropriate sites to the extent of effectively preventing the use of cogeneration at a particular existing industrial or agricultural facility. If sites were still available, these requirements could hold cogenerators' intakes to percentage-of-stream-flow limits so stringent as to effectively preclude their development. Meeting a minimum cooling water recirculation limit could be impossible or at best undesirable for a cogeneration unit, where cooling water from the cogeneration unit may subsequently be reused as process water by the steam host (for improved energy efficiency) and then treated and discharged.

EPSA believes that EPA should more carefully consider and address these plants' unique circumstances through either an exemption or heightened flexibility that ensures that they will not be inadvertently disadvantaged by this rule. This recommendation is discussed in greater detail below.

Footnotes

1 A cogeneration unit is energy-efficient because the thermal energy used to produce electricity is also used for another process – usually for process steam requirements at an industrial facility (the "steam host"). There may be many other interconnections between the cogeneration unit and the steam host: boiler feedwater may be supplied by the steam host, and condensed steam from the industrial process may be returned to the cogeneration unit. Boiler shell or turbine cooling water, or cooling water used to condense steam, may then be used as process water for the steam host.

EPA Response

EPA disagrees with the commenter's claims that the section 316(b) New Facility Rule would affect siting options for cogeneration units. First, EPA wishes to point out that this rule will only affect new and stand-alone facilities that are substantially independent and not units that are not substantially independent. Second, EPA analyzed the potential siting implications of the proportional flow requirements and determined that within the United States approximately 131,147 river miles have sufficient flow to support the water usage needs of large manufacturing facilities withdrawing up to 18 MGD of water without exceeding the proportional flow limitations in this rule. Approximately 53,964 river miles could support a large non-utility power-producing facility withdrawing 85 MGD, and approximately 14,542 river miles could support a large utility plant requiring 700 MGD without exceeding of the proportional flow limitations in this rule (see preamble to the final rule). Third, EPA wishes to point out that cooling water from the cogeneration unit which is subsequently be reused as

process water would be considered as reuse/recirculation. Cogenerators may therefore find it easier to meet the recirculating requirements of this rule.

Comment ID 316bNFR.041.005

Subject Matter Code	22.1
CWIS Impacts and Benefits	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Impacts on Electricity Reliability

The disregard of electricity market impacts has a critical electricity reliability and energy security aspect as well. Electricity shortages are being experienced in several regions of the country and new power generation capacity is needed as quickly as possible to stabilize system reliability and markets. The North American Electric Reliability Council has consistently expressed concern about shortfalls in capacity to meet demand growth, and looks to merchant plant developers' success in building plants on a timely basis as the promise for continued reliability of supply. The Federal Energy Regulatory Commission also has stressed the need for generating capacity additions to provide critical support for fast-evolving competitive markets and increasing demand. In its recent order on California's electricity market (93 FERC 61,121), the Commission reiterated its belief that new merchant capacity is critical to ensuring reliable electricity supply.

The imposition of blanket study requirements applicable to all new projects, especially as currently proposed by EPA, could seriously disrupt the development of new capacity required to serve electricity system reliability needs. EPSA urges EPA to revise its plans to require time-consuming and resource-intensive studies in cases where they may not be necessary to meet the environmental objectives of this rulemaking. We propose alternative scenarios for meeting these objectives in the "applicability requirements" section of this filing.

EPA Response

EPA has designed the final section 316(b) New Facility Rule to allow for expedited permitting. The two track approach allows facilities to avoid lengthy pre-operational study requirements, as are common under the current site-specific implementation, by complying with the requirements of Track I. Please refer to the response to comments 316bNFR.512.003 (comment category 23.6) and 316bNFR.524.085 (comment category 21.4).

In addition, EPA has determined that the final section 316(b) New Facility will not adversely affect energy supply. For more information, see EPA's response to comment 316bNFR.512.003 (comment category 23.6) and Chapter 9: Other Economic Analyses.

Comment ID 316bNFR.041.006

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Environmental Impacts of Increasing Internal Load

Certain advanced technologies are very energy-intensive, such that they decrease plant efficiency and increase internal demand for electricity associated with cooling tower operation. During critical summertime conditions, facility generation capacity can be reduced by several percentage points or by 10 MW or more for a 500 MW generating station. Accordingly, there may be attendant environmental detriments that would compromise the benefits that this rulemaking seeks to promote. In particular, air emissions of NOx and carbon would be increased in order to maintain power supply. Should this capacity have to be made up by coal- or oil-fired facilities, significant quantities of additional air emissions could result. EPA should carefully consider these effects not only in the context of protecting water quality, but in the context of the air and other impacts that are likely to result from increased fuel use, and operations generally, as a result of generating more electricity to support advanced cooling technology systems. This will be a particular concern in areas that do not attain the national ambient air quality standards.

EPA has appropriately avoided making dry cooling systems the standard cooling technology and should not do so now. Such technology is significantly more costly to construct and operate, reducing the competitiveness of clean, efficient combined-cycle and cogeneration plants and making the goals of cheaper, cleaner power more difficult to attain. As importantly, dry cooling has its own environmental impacts: (1) reduced power generation efficiency leading to increased air emissions; (2) increased noise generation; and (3) larger towers leading to increased demands for space and greater visual impacts. The two latter environmental issues introduce significant constraints on project development due to the need for significantly larger sites as well as quality of life effects on the local population.

With respect to EPA's proposed provisions for cooling towers, we encourage EPA to consider their efficiency, internal load and other environmental effects as well. Cooling tower systems in general are less efficient, resulting in a greater use of natural gas and thus increased air emissions per megawatt of power produced. One particular consideration relates to seawater cooling tower systems, which cause significant PM10 emissions and have negative impacts on nearby agricultural areas. Accordingly, we are concerned that from a larger environmental perspective, once-through seawater cooling has been demonstrated to be superior to cooling towers.

As noted below, adverse environmental impacts (AEI) take many forms, and overall environmental impacts should be minimized by proper consideration of all potential effects, not only those limited to the aquatic ecosystem. This balance is critical given that placement and operation of CWIS in many settings will result in minimal environmental impact.

EPA Response

Regarding energy impacts of cooling systems see response to comments #316bNFR.068.332 and Chapter 3 of the Technical Development Document.

Regarding EPA's decision to not adopt dry cooling see Section V.C of the preamble to the final rule.

Regarding overall environmental impacts see response to comments #316bNFR.068.100 and #316bNFR.014.019.

Comment ID 316bNFR.041.007

Subject Matter Code	24.0
Economic and Engineering Analysis (EEA)	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Estimation of Cost of the Rule

EPA's estimates of the costs of the rule are based on several critical, and arguable, assumptions: (1) the rate of new facility development in the coming years; (2) the proportion of those facilities that will employ CWIS; (3) the costs of adopting one technology versus another, and particularly the loss of once-through cooling as an option; and (4) the increased costs of scientific and engineering studies to support the permitting and design of the CWIS. The combination of EPA's assumptions on these issues produces a significant underestimate of the costs of compliance with the proposed rule. Each of these aspects is discussed separately below. In total, EPSA believes that EPA has underestimated the cost of the proposed rule by as much as one-hundred fold.

EPA Response

This comment is the summary of four other comments categorized into the comment categories to which they apply. Responses to the four issues raised by the commenter can be found in the following categories:

(1) the rate of new facility development in the coming years: see response to comment 316bNFR.041.008 in comment category 8.1;
(2) the proportion of those facilities that will employ CWIS: see response to comment 316bNFR.041.009 in comment category 8.1;
(3) the costs of adopting one technology versus another, and particularly the loss of once-through cooling as an option: see response to comment 316bNFR.041.010 in comment category 21.1;
(4) the increased costs of scientific and engineering studies to support the permitting and design of the CWIS: see response to comment 316bNFR.041.011 in comment category 19.2.

Comment ID 316bNFR.041.008

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Rate of New Facility Development

EPA has developed a database of the projects currently under development in the United States. This data is based largely on permit applications submitted to agencies. The database identifies 57 new facilities, and does not adequately reflect the current and anticipated future rate of project development. EPSA maintains an informal database of publicly-announced projects that currently number 350 facilities. Even this substantially larger database has been difficult to keep current and does may not include all of the projects that EPSA's members currently have under construction. EPSA's members believe that the current rate of project development will continue for several more years as electricity competition evolves and electricity demand continues to increase. In fact, as noted above, electric power supply remains at very low levels relative to demand in several major regions of the United States. Thus, the EPA database of new facilities, which is and an important factor in the estimated cost, greatly underestimates the number of plants likely to be subject to section 316(b) requirements.

EPA Response

EPA disagrees with the commenter that the database identified by EPA "does not adequately reflect the current and anticipated future rate of project development." EPA would like to point out that the commenter's comparison of the 56 new combined-cycle facilities for which EPA obtained cooling water source information (note that EPA identified 56 facilities with cooling water information, not 57) with the 350 publicly-announced projects in the EPSA database is not valid. The 56 facilities identified by EPA are a subset of the January 2000 NEWGen database which included a total of 466 projects. A more accurate comparison would therefore be to compare the 350 facilities in the EPSA database to the 466 facilities in the NEWGen database used by EPA. It should be noted that, similar to the 466 NEWGen facilities, not all 350 facilities identified in the EPSA database are in scope of the final rule. EPA's research has showed that the majority of new electric generators proposed are not in scope of this rule because they (1) do not use a steam electric generating technology and therefore do not require cooling water, (2) do not withdraw water from a surface water source; (3) do not operate a new or modified cooling water intake structure; or (4) have a design intake capacity of less than two MGD.

EPA recognizes the rapid development in the industry. EPA updated its analysis for the final rule, using the February 2001 version of the NEWGen database, which includes substantially more new projects (941, an increase of over 100 percent).

Comment ID 316bNFR.041.009

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Proportion of New Facilities Using CWIS

EPA has based the proportion of new facilities using CWIS on the information contained in its facility database. Seven (or 12%) of the 57 facilities that had submitted applications plan to use CWIS. An informal poll of EPSA members indicates that this proportion should be approximately twice as high.<FN 2> Many merchant power developers prefer to construct and operate combined cycle facilities over simple cycle ones, indicating the need to dispose of waste heat and the potential to construct CWIS for the majority of facilities. Use of evaporative cooling towers fed by surface water is not only economically favored over dry condensers but in many states, use of surface water is being emphasized over groundwater by the regulatory agencies. Again, EPA has underestimated the importance of CWIS in the population of new facilities.

Footnotes

2 Many simple cycle facilities are constructed with the intention to convert the facility to combined cycle in the future.

EPA Response

EPA disagrees with the commenter's claim that it underestimated the importance of CWIS for new facilities. EPA used the most current and complete data available at the time of proposal to project the number of new electric generators and their cooling water characteristics. EPA updated and expanded its research for the final rule analysis as new data have become available. In support of the final section 316(b) New Facility Rule, EPA used the February 2001 version of the NEWGen database. Compared to the January 2000 NEWGen database used for proposal, the newer version contains more than twice the number of new projects (941 compared to 466). EPA researched more than three times as many greenfield and stand-alone combined-cycle facilities (320 compared to 94) and obtained cooling water source information on almost four times the number of facilities (199 compared to 56). Of the 199 new combined-cycle facilities for which cooling water data were available, EPA identified a much larger number that were in scope of the final section 316(b) New Facility Rule (57 compared to seven). This results in an in-scope rate of 28.6%, approximately twice as high as the in-scope rate estimated for the proposed rule analysis. The commenter's own estimate seems to support EPA's analysis.

EPA agrees that there is a trend toward combined-cycle facilities, indicating a need to dispose of waste heat. However, this does not necessarily mean that facilities will build a CWIS. EPA has found that a majority of new facilities are using non-surface water. Specifically, out of the 199 new combined-cycle facilities for which EPA obtained cooling water data, 133, or 67 percent, will use non-surface water for cooling purposes. The 133 non-surface water sources are distributed as follows: 44 out of 199 facilities or 22% will use municipal water, 32 or 16% will use groundwater, 23 or 12% will use gray water, 22 or 11% will use dry cooling, and 12 or 6% will use unknown or multiple non-surface water sources.

Comment ID 316bNFR.041.010

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name Lynne H. Church

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Costs Associated With Shifts in Cooling and CWIS Technologies

EPA has not well accounted for the costs of adopting different cooling and CWIS technologies. EPA has essentially assumed that planned facilities will largely be compliant with the strict technology requirements of the proposed rule. In particular, EPA has neglected the potential costs with adopting cooling towers rather than once-through cooling; the costs of potential mitigation strategies including placement outside of the littoral zone, and the costs implicit in the lost development potential of certain sites.

Once-through cooling is a very favorable economic option for new facility development. Not only is this option often less expensive to construct, it also allows for much more efficient power generation. Thus, it remains in many project settings a configuration option that many developers are compelled to consider. EPA, in its proposed rule, has made development of such a cooling system much more difficult yet it has failed to account for the costs of losing that option to the electric generation community. The combined capital costs and loss of operational efficiency associated with the shift from once-through cooling to evaporative cooling can amount to tens to hundreds of millions of dollars for each affected facility.

EPA's cost estimates appear to assume that facilities would have been compliant with the requirements of the proposed rule without any additional expenditure. EPSA believes that aspects of the proposed rule will increase the cost of plant design and construction. In particular, placement of the CWIS outside of the littoral zone and use of additional protection measures such as wedge-wire screens can increase project costs by hundreds of thousands of dollars or more.<FN 3>

Finally, compliance with the rule is very likely to make some sites difficult or impossible to permit. EPA's proposed stream flow requirements imply that certain sites, while quite advantageous in every other siting aspect, will be unavailable for development. The costs to developers of this lost opportunity could be quite significant.

Footnotes

3 The costs for an offshore (yet still in the littoral zone) placement of a moderately-sized intake can be tens of millions of dollars.

EPA Response

The commenter asserts that EPA has neglected the potential costs associated with adopting cooling towers in favor of once-through cooling. This statement is incorrect, as EPA projects, and includes in its national cost estimates, 9 power plants of varying sizes and fuel types and 29 manufacturing facilities in a variety of industry sectors who absent this rule, would have adopted once-through systems rater than closed-cycle recirculating cooling systems. The Agency's projections of the number of facilities within scope of the rule and incurring costs utilize the best information available to EPA and provide reliable forecasts of new facilities. See the Economic Analysis. EPA accounts for

the costs of these installations in the final rule and has concluded that the total annualized costs of these technologies is economically practicable for the regulated entities.

The commenter asserts that EPA has neglected the costs of potential mitigation strategies including placement outside of the littoral zone. This statement is incorrect. The final rule does not require placement of intakes outside the littoral zone. See response to comment 316bNFR.009.003 or 316bNFR.014.017 for further discussion of littoral zone and why EPA removed the related requirements for the final rule.

For the final rule, and as discussed in the notice of data availability, EPA has incorporated an "energy penalty" cost into the national cost estimates for those facilities projected to install wet cooling towers in place of once-through systems. See responses to comments 316bNFR.068.332 and 316bNFR.068.100.

The lost development potential of certain sites, as mentioned by the commenter, is addressed by EPA in the final rule in several ways. First, as summarized in the memo "5% Flow Threshold Data Analysis" in the docket, EPA's supporting analysis for the proportional flow limitations associated with particular waterbody types (e.g., the requirement that a facility not intake greater than 5 percent of the mean annual flow of a river or stream) estimates that a very high percentage of facilities will meet the proportional flow requirements of the rule without re-siting. For the small percentage of facilities that may not meet these proportional flow requirements, EPA anticipates that these new facilities would always have the option to site elsewhere at very minimal cost. See the record for today's rule. Second, by basing the final rule on a two-track option, EPA has provided sufficient means for facilities to site large once-through facilities in a wide range of locations as long as the entrainment levels are reduced accordingly. Track II of the final rule provides flexibility to the regulated entity in order to develop site-specific alternative entrainment reduction techniques rather than reduction of cooling water intake flow to comply with the requirements of Track I. See Chapter 5 of the Technical Development Document. Thirdly, because the rule applies to new sources only, the development potential of certain hypothetical sites is a concept that cannot be clearly defined. Considering that 90 percent of new electric generating facilities subject to this rule would install closed-cycle recirculating wet cooling systems regardless of the influence of today's requirements, the universe of "certain sites" refers to a minority of future sites. For these sites, EPA has fully considered and accounted for the costs of meeting the requirements of the rule.

The assertion that the costs to shift from once-through to closed cycle recirculating cooling can amount to tens of hundreds of millions of dollars for each effected facility is vague and devoid of clarifying information. The assertion that costs associated with the use of screens can increase project costs by hundreds of thousands of dollars is also vague and without supporting information. In brief, the generalized assertions presented in the comments regarding the underestimation of cost are unsubstantiated.

Comment ID 316bNFR.041.011

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Costs Associated With Environmental Characterizations

The facility costs that EPA has calculated are dominated by costs associated with pre-construction evaluation and operational monitoring. EPSA believes that these costs are likely underestimated by a factor of ten or more. The sort of studies suggested by EPA in the proposed rule are considerably more costly to define and execute than the EPA appears to have assumed. It is not uncommon for the permitting studies for a moderately-sized CWIS associated with cooling towers to cost well over $100,000. In fact, based on experience with the existing regulatory program, section 316(b) demonstrations for once-through cooling facilities can cost several million dollars. Many of the studies suggested by EPA (e.g., post-operational monitoring of fisheries) are very labor intensive and expensive. Other aspects of the studies (e.g., monitoring of approach velocities in certain settings) are unprecedented and may be impossible to perform reliably.

Of great importance to EPSA's members is EPA's proposed time line for the development and execution of waterbody studies. EPA proposes many months of study prior to permit application. Such a requirement places a tremendous burden on developers and challenges their ability to build plants on a market-responsive basis. Again, the costs associated with this requirement would be very significant and, in many cases, would preclude the development of projects. As importantly, this requirement appears to be flatly inconsistent with EPA's proposal for generic technology requirements for CWIS. In essence, it retains the site-by-site review aspects of the current section 316(b) policy complete with the attending burdens on the developers and the reviewing agency.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.041.012

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Lynne H. Church

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Applicability Thresholds

In enacting section 316(b), Congress responded to studies in the 1960s that found that certain large utility CWIS, intaking hundreds of millions of gallons of water per day, were significantly affecting surface water aquatic biota. While such cases clearly should be prevented, EPSA is concerned that the proposed rule takes concerns about relatively few, very large intake structures and uses them to justify onerous requirements for thousands of relatively small CWIS. This is especially concerning because decades of experience with CWIS have not produced evidence of widespread adverse impacts to aquatic biota from these structures, with the exception of relatively few structures that are large and/or located in ecologically sensitive zones.

EPSA urges EPA to ensure that the resources of permitting agencies and affected sources are focused on cases in which there is a significant potential for AEI and therefore warrant further investigation. To this end, EPSA supports an applicability threshold for 316(b) requirements that would avoid applying burdensome procedures to thousands of intake structures with little or no potential for causing adverse environmental impact.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow (estimated total flow is approximately 9 billion gallons per day) and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such

site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.041.013

Author Name Lynne H. Church

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Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

EPSA believes that the 2 million gallons per day (mgd) cutoff that EPA has proposed, however, is too low to accomplish that objective. Accordingly, EPSA urges EPA to revise its de minimis threshold to a level that more appropriately and reasonably addresses sources that may cause AEI.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Comment ID 316bNFR.041.014

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Lynne H. Church

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While EPSA has not developed a detailed alternative proposed flow threshold for 316(b) applicability, we are aware of at least one alternative approach that EPSA believes is more reasonable and should be considered by EPA.

Under this alternative applicability threshold, new facilities would qualify for a de minimis exemption if they use CWIS with a design intake flow: (a) less than or equal to 10 mgd; or (b) greater than 10 mgd but less than or equal to 25 mgd, if the flow did not exceed (1) 10 percent of the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically (7Q10) of the source water, for a non-tidal river, or (2) 10 percent of the mean annual volume of a lake or reservoir, or (3) 10 percent of the volume of the water column in the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level, for a tidal river or estuary.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

No percentage flow threshold has been added to the applicability provisions; proportional flow limits exist in the rule. In addition, EPA has removed the low flow percentage threshold from proportional flow requirements of the rule. EPA believes the mean annual flow provides a sufficient measure of the conditions EPA seeks to protect. The Agency also notes that Track I of the rule includes reduced

requirements for new facilities that withdraw between 2 and 10 MGD.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.041.015

Author Name Lynne H. Church

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Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

EPA has recognized that a 2 mgd threshold would still leave almost all of the cooling water flows subject to regulation—99.97 percent in EPA's judgment (65 Fed. Reg. 49,068). Clearly, if there is a sound premise for exempting smaller sources at all, which EPSA believes there is, it is not served by a threshold that removes only 0.03% of the intake water flows from the regulatory program.

Nor is it relevant that the percentage excluded may be higher for new facilities—if a new facility has minimized its cooling water needs by dramatically reducing the amount of water it must withdraw compared to an existing facility, that is an indication that the new facility has already taken action to minimize adverse environmental impact, not an indication that such a small flow needs to be regulated.

EPSA believes that a 25 mgd cutoff would still leave more than 99% of cooling water flows subject to regulation. This would certainly limit the rule to intake structures with the potential to warrant regulation, while dramatically simplifying implementation of the rule and reducing its impact on small businesses. This would also address many of EPSA's concerns about impacts on merchant generators and competitive markets generally.

EPA Response

See response to 316bNFR.012.015.

Comment ID 316bNFR.041.016

Subject Matter Code	7.1

Definition: New Facility

Author Name Lynne H. Church

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Treatment of Brownfield, Greenfield and Repowered Sources

In the proposed rule, a "new facility" is defined to mean "new source" or "new discharger" in 40 CFR 122.2 and 122.29(b)(1), (2), and (4) (65 Fed. Reg. 49, 116). This reference confuses the definition and obscures EPA's stated intent, which is that the rule is to apply to new greenfield and stand-alone facilities. However, the inclusion of these other definitions could be interpreted to cover modifications at or expansion of existing facilities. The criteria in 40 CFR 122.29 includes sources that (1) totally replace the process or production equipment that cause the discharge of pollutants at an existing source or (2) have processes substantially independent of an existing source at the same site.

EPSA believes that the proposed rule should apply only to new "stand-alone" or "greenfield" facilities (65 Fed. Reg. 49,066). EPSA urges EPA to clarify the proposed rule accordingly, as this aspect of applicability currently is unclear and subject to potential misinterpretation. EPSA is concerned that sources other than greenfield or stand-alone facilities will otherwise be encompassed in this rulemaking.

By treating brownfield and greenfield facilities in the same manner, the proposed rule eliminates any incentives for development of more efficient facilities. EPA should allow flexibility to encourage development of efficient and innovative technologies at any site, but explicitly apply this rule only to greenfield sites. It is also possible that, under the proposed definition, repowered units will be considered "new facilities" - a situation which EPSA believes should be avoided, for the same reasons.

EPA Response

See response to 316bNFR.030.003.

Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. Thus, the definition of a new facility in the final rule applies to a facility that is repowered only if the existing facility has been demolished and another facility is constructed in its place, but modifies the existing cooling water intake structure to increase the design intake capacity. In this way, the rule allows for numerous types of changes to existing facilities (i.e., it does not treat all brownfield facilities the same with regard to applicability of the rule), while defining new facilities in a manner consistent with existing NPDES definitions addressing new sources and new dischargers. In addition, where an existing (i.e., brownfield) facility

meets the definition of a greenfield or stand alone facility, the implementation burden and economics are such that the facility can afford the costs of the rule.

Comment ID 316bNFR.041.017

Subject Matter Code	7.1

Definition: New Facility

Author Name Lynne H. Church

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Definitions of “New” and “Routine Maintenance”

The proposed rule is also somewhat ambiguous on the transition point for new facilities or recently constructed facilities. Although a facility would not be subject to the rule if it was constructed prior to the rule’s implementation date, it is unclear what standards and criteria would apply to facilities under construction or recently constructed. As this raises important questions for developers, EPA should clarify this point and explicitly state that these facilities are not subject to the proposed new facility rule.

As a related point, the preamble of the proposed rule states that "Routine maintenance and repair to an intake structure which is currently withdrawing cooling water and does not result in an increase in design capacity is not considered a modification. Facilities that meet the conditions of 40 CFR 122.29(b)(3) would be considered to be undergoing a modification and would not be considered a 'new facility' under these regulations" (65 Fed. Reg. at 49066). The use of this criterion in other statutory structures has proved to be problematic for the electricity generating sector. Therefore, EPSA urges EPA to define routine maintenance and repair as any maintenance, repair or replacement of any component of a plant's cooling water system that does not result in an increase in design capacity. This would provide a sound and descriptive definition of "routine maintenance" that provides meaningful guidance to facilities in determining the applicability of this rule.

EPA Response

The Agency chose the commencement of construction date because it was generally consistent with the term "new source" in the existing NPDES permitting regulations and it should provide adequate notice and time for facilities to implement the technological changes required under the rule. The date a facility commences construction is clarified at 40 CFR 122.29(b)(4). This provision describes certain installation and site preparation activities that are part of a continuous onsite construction program; it includes entering into specified binding contractual obligations. Thus, under today's rule facilities that are constructed or commence construction within the meaning of 40 CFR 122.29(b)(4) prior to or on the effective date of the final rule are not new facilities. Such facilities will be addressed under the Phase II or III rules. Those that commence construction after the effective date of this rule and meet the other regulatory thresholds defined in § 125.81 are subject to the requirements of this rule.

EPA has not defined “routine maintenance” in the final rule because clarifying what constitutes routine maintenance is not vital to the definition of new facility. Under the new facility rule, to be considered a new facility a facility must be a new source or new discharger and use a newly constructed cooling water intake structure or a modified existing cooling water intake structure whose design intake has been increased. Thus, changes to a cooling water intake structure at an existing facility that is not a new source or new discharger are not subject to this rule. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA

has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule.

Comment ID 316bNFR.041.018

Subject Matter Code MISC

Miscellaneous Comment

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Treatment of Cogeneration Facilities

As discussed above, because cogeneration is engaged in electricity generation while its steam host is not, a cogeneration unit might be considered a "new source" under 40 CFR § 122.29(b)(1). EPSA recommends that EPA explicitly exclude new cogeneration units located at existing facilities from the definition of "new facilities" subject to the section 316(b) standards for new sources. If it does not do so, EPA should build sufficient flexibility into the new source standards to accommodate the unique circumstances associated with cogeneration units, described above. As proposed, 40 CFR § 125.84 would stifle the development of cogeneration at existing industrial facilities, frustrating congressional policy of encouraging cogeneration and its environmental and efficiency benefits.

EPA Response

The final rule does not explicitly exclude new cogeneration units located at existing facilities from the definition of "new facilities" subject to the section 316(b) standards for new sources. However, the revised new facility regulatory language clearly states that the rule applies only to greenfield and stand alone facilities and excludes new units that are added to a facility for the same general industrial operation or that serve as an integral part of the existing facility's operation. Please see response to 316bNFR.012.013 and 316bNFR.030.003.

The final rule establishes technology-based performance requirements, based on a two-track approach, which gives sufficient flexibility into the new source standards to accommodate the unique circumstances associated with cogeneration units. Under Track II the facility would be allowed to conduct site-specific studies to demonstrate to the permit director that alternative technologies or approaches could reduce impingement and entrainment to a comparable level as the Track I technology-based performance requirements.

Comment ID 316bNFR.041.019

Subject Matter Code 10.01

Regulatory Framework Options

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Role of Studies

The lawsuit precipitating this rulemaking was intended to prompt EPA to depart from site-specific approaches to technology requirements and set a more objective standard. However, EPA has proposed to set a best technology standard as well as require site-specific studies. It is unnecessary and inappropriate for EPA to ask developers to both comply with a strict, protective standard and conduct the detailed and costly studies. Instead, studies should only be required in cases in which applicants are seeking an alternative to compliance with those requirements. In such cases, studies should only be conducted to the extent necessary to demonstrate the appropriateness and protectiveness of the alternative approach sought by the applicant. To this end, EPSA believes that the studies discussed below (under "monitoring") would be appropriate.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I.

Under Track I a facility would be required to submit minimal existing information to be provided to the permitting authority. Additional information would be required under Track II to demonstrate that a facility's proposed technology suite would meet the requirements of Section 125.84. EPA does not believe that this approach entails facilities to both comply with a strict, protective standard and conduct detailed and costly studies. The regulated entity has the opportunity to choose which track it will follow.

Comment ID 316bNFR.041.020

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Lynne H. Church

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Definition of Adverse Environmental Impacts

The definition and avoidance/minimization of AEI are, respectively, the foundation and objective of the rulemaking. However, the rulemaking is not based on a definition of AEI; thus, the technological requirements at the heart of the rule do not have an adverse impact definition as a reference point. Before we can know what are appropriate technological and/or other requirements, we must know exactly what we are trying to achieve or avoid.

EPA Response

Please see response to comment 316bNFR.009.001.

Comment ID 316bNFR.041.021

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

The adverse impact definition under section 316(a) is reasonable and pragmatic. It seeks to protect a healthy, balanced, indigenous ecosystem/community. Section 316(b) ostensibly goes beyond this to seek no degradation from historic baseline levels. The definition of AEI impact under section 316(b) should take an approach similar to that of section 316(a) in protecting the aquatic ecosystem.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.008, and the preamble to the final rule.

Comment ID 316bNFR.041.022

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

As part of this rulemaking, EPA must define AEI. The basic premise of the statutory provision is that AEI must be minimized. EPSA urges EPA to use the following definition:

Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, (2) is attributable to the operation of the cooling water intake structure, and (3) is balanced against other non-aquatic environmental impacts.

The definition should also include a list of factors to be used in evaluating and determining AEI. In order to minimize AEI, the regulated community must understand what is expected and what are the dimensions of AEI. The goal of the statutory provision is to protect and ensure a healthy, balanced, diversified ecosystem. This should be clearly stated and reflected in the definition of AEI.

EPA Response

Please see response to comment 316b.NFR.069.008 and the preamble to the final rule for additional discussion of the issues raised in this comment.

Comment ID 316bNFR.041.023

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

Author Name Lynne H. Church

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Role of Proposed Indicators

Focus on the littoral zone as a special protection area is inappropriate. EPSA is concerned that the littoral zone is an inappropriate indicator of impacts, as different waterbodies have different characteristics based on a variety of factors, not limited to distance from shore or depth. Accordingly, EPSA believes that EPA may not achieve the regulatory consistency it seeks through the use of the littoral zone, which is defined in terms of a zone of light penetration with the potential for rooted plant production rather than aquatic community habitat. The focus of the proposed rule, by contrast, is the reduction of impingement/entrainment of fish and other aquatic biota to levels that would minimize AEI. Use of the littoral zone to define the sensitivity of fish and other pelagic aquatic organisms subject to impingement/entrainment is at best an indirect indicator. As such, this approach may miss some sensitive areas that are outside the littoral zone and it may place restrictions on areas in the littoral zone where fish populations are not sensitive to impingement/entrainment impacts.

In addition, the use of a littoral zone to identify areas of sensitivity may encourage facilities to locate their CWIS offshore and in deeper waters which may, in turn, actually increase the potential for impingement or entrainment, depending on the resident species. Finally, even assuming the general proposition that littoral zones are a reasonable surrogate for identifying significant areas of fish production or habitat, an intake structure placed in an area of aquatic sensitivity will not necessarily cause an AEI. Factors such as the particular life cycle and behavioral patterns of the potentially impacted species must be considered. For example, some fish species build nests for their eggs, such as sunfishes and catfishes. Others produce eggs that sink to the bottom and adhere to plants or substrate. The eggs of these species have a much lower potential for entrainment than species that are broadcast spawners or have early life stages that are pelagic in nature.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using

alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.041.024

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

EPSA believes that impacts, and strategies for their avoidance, should be more closely tied to the ecosystem/community approach used in section 316(a). The arbitrariness of the littoral zone as an indicator obscures the actual impacts or benefits of any environmental management or compliance strategy.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.008, and the preamble to the final rule.

Please note that EPA rejected the littoral zone approach for the purposes of today's final rule.

Comment ID 316bNFR.041.025

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Monitoring Studies

EPSA is concerned about the proposed monitoring studies with respect to the required study elements, time required, and costs.

The Source Water Baseline Biological Characterization study proposed for initial permitting, and each re-permitting of a facility, will require biological studies that are time consuming, costly and unnecessarily extensive. As discussed above, EPSA believes that such studies should only be required if alternative standards are requested and not if the strict technology-based standards are adopted.

If the technology-based standards are adopted by a facility, more appropriate monitoring studies would focus on the evaluation of habitat in proposed locations for CWIS and avoidance of placement of CWIS in important habitat areas such as spawning and nursery areas and threatened/ endangered species habitat. This approach, already commonly used by regulatory agencies, would avoid unnecessarily time-consuming and expensive studies that may jeopardize the viability of many projects.

It should be noted that experience with section 316(b) field studies indicates that the cost presented in the rule for the proposed Source Water Baseline Biological Characterization study is much lower than would be expected. EPA's estimated cost is $32,000; actual costs are expected to be at least several hundred thousand dollars.

Many of the other proposed studies should also not be required, particularly if the technology-based standards are adopted by a facility. For example, as discussed above, the focus on the littoral zone is inappropriate and specific studies to define the littoral zone are unnecessary. Also, the proposed in-situ velocity measurements at the intake screen should not be required. The measurements are logistically complex to perform, requiring the construction of a structure to fasten velocity meters to the face of the intake screen. Implementation would be particularly difficult for submerged CWIS. The complexity of performing these measurements does not appear to have been considered by EPA as the study costs presented in the rule are unrealistically low. In addition, the rationale for the measurements is not provided in the rule, so the objective of the measurements and decision criteria for acceptable results are unknown.

Finally, the proposed entrainment and impingement monitoring program should not be required if the technology-based standards are adopted by a facility. These standards are designed to minimize impingement and entrainment, and adoption of strict protective technological standards should be adequate to demonstrate that the objectives of section 316(b) and minimization of AEI have been achieved.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.041.026

Subject Matter Code 13.1

Requirement of 0.5 fps

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Technology-based Requirements

Numerous studies have been performed to assess the swimming speeds of a variety of fish species under a range of environmental conditions in order to evaluate the potential for impingement at intake screens and determine a protective intake velocity. Intake flow velocities in the range of 0.5 foot/second to 1 foot/second have typically been determined to be protective of most species under most conditions. This range was cited in the 1982 "Design of Water Intake Structures for Fish Protection" by the American Society of Civil Engineers. EPSA is aware of no facilities with CWIS intake velocities in this range that have experienced a significant degree of impingement. In fact, many facilities with much higher intake velocities have relatively low impingement rates.

Therefore, EPSA recommends a range of 0.5 foot/second to 1 foot/second as the technology-based standard, with a higher intake velocity allowed as an alternative based on the results of site-specific studies. Also, the standard should be based on approach velocity, which is a more appropriate physically-based measure (than through-screen velocity) of the intake velocity experienced by fish in the vicinity of a CWIS.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

See response to comment 316bNFR.027.037 for information on the applicability of today's rule to existing facilities.

Comment ID 316bNFR.041.027

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Subject Matter Code 10.12

Request for Comment: Best Technology Available Requirement "Trading"

Implementation Issues

EPSA supports EPA's inclusion of trading and banking as compliance options that provide added implementation flexibility. However, EPSA encourages EPA to design such provisions to maximize their administrative efficiency in practice, as the benefits of such mechanisms depend upon their use in practice. If trading and banking are administratively burdensome or costly, they will not be likely to be used.

EPA Response

See response to 316bNFR.008.009.

Comment ID 316bNFR.041.028

Subject Matter Code 15.13

Discretionary/Voluntary Approaches

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

EPSA also supports restoration measures as a strategy for avoiding or addressing aquatic impacts, as they may be the most appropriate and effective approach in some cases. However, given the site-specific nature of this approach, restoration should only be used in cases where site-specific alternatives to strict technology requirements are sought by the applicant.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.041.029

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Subject Matter Code 10.08

Option for Alternative Technology Requirements

Factors other than cost should be used to determine whether alternative technologies are appropriate. The proposed rule provides for the use of alternative technologies only if it can be demonstrated that the costs are wholly disproportionate to the costs used to develop the criteria. However, other factors such as the potential for aquatic or other environmental impacts should also be considered.

EPA Response

See response to 316bNFR.028.033 and the preamble to the final rule.

Comment ID 316bNFR.041.030

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Since section 316(b) states that environmental impacts should be minimized, non-aquatic environmental effects (such as noise and air pollution and consumption of water resources by cooling towers) should be considered.

EPA Response

See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Comment ID 316bNFR.041.031

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

EPSA urges EPA to provide flexibility to affected sources in a manner that recognizes the realities of facility construction and siting. An alternative approach has been developed by the Utility Water Act Group and the Edison Electric Institute that EPSA believes is more reasonable and worthy of adoption in this rule.

The alternative contains two compliance options. In the first option, a source could use a type of site-specific, tiered approach using an "adverse environmental impact" test. If the facility would cause an AEI, the applicant and the agency would determine which CWIS technology would be "best," given site-specific benefits and costs. As part of this process, applicants would collect data and, as necessary, perform additional studies to assess the potential for AEI. Where AEI are found to potentially exist, applicants also would evaluate the availability, costs, and benefits of alternatives. To support both agencies and applicants' efforts, EPA could develop guidance or rules on related issues as criteria to be used in selecting best technology, definition of AEI, and what cost-benefit analyses are appropriate.

The second option would allow applicants to seek an expedited section 316(b) determination. Under this approach, EPA would identify technologies or characteristics that would be considered to be "highly protective of aquatic resources." The applicant could employ these technologies or characteristics in its facility and/or CWIS, and receive a determination by EPA or the permitting agency that section 316(b) requirements were satisfied. This would afford facilities greater certainty in compliance planning and would minimize the need for expensive, time-consuming and unnecessary studies.

Although this proposal is similar to one of the proposed EPA alternatives, the "rebuttable presumption" alternative, this approach will provide more flexibility with fewer costs, delays and development impacts in general.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. The approach used in the final rule is very similar to that described by the commenter in that it allows either an expedited or site-specific compliance track. All cooling water intake flow results in the potential for impingement and entrainment. For this reason, EPA did not adopt an approach in the final rule that focuses primarily on assessing whether AEI is occurring. Rather, the rule establishes technology-based performance requirements and offers new facilities the option of meeting the required levels of performance through the use of those technologies that most effectively reduce harmful environmental impacts at their site.

Comment ID 316bNFR.041.032

Subject Matter Code 18.2

Compliance Cost/Revenue Test

Author Name Lynne H. Church

Organization Electric Power Supply Assn. (EPSA)

One additional concern relates to EPA's use of a compliance cost/revenue test to demonstrate that the proposed requirements are economically reasonable in light of affected generators' revenues. In the competitive electricity marketplace, revenues are far less predictable than in the traditional monopoly system. The added effect of revenue uncertainties to EPA's underestimation of compliance costs associated with the rule further undermines EPSA's confidence in the cost estimates underlying the proposed regulatory approaches.

EPA Response

EPA has considered the commenter's concerns. EPA recognizes that there is some uncertainty regarding revenues for some industries but remains confident that the use of the compliance cost/revenue test to demonstrate that the proposed requirements are economically reasonable is the appropriate measure available. EPA has issued many rules for industries in competitive markets. EPA evaluated the requirements of the final rule by considering the annualized compliance costs of the rule compared to the estimated facility revenues, as well as the initial compliance costs compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA, to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA.

For the final analysis, EPA estimated expected annual revenues for electric generators based on assumptions regarding future electricity sales for each facility and electricity prices. For each generating facility, revenues were calculated using the model facility's generating capacity, a projected capacity utilization, and the projected price of electricity (see Chapter 7: Economic Impact Analysis for a detailed discussion of EPA's estimation of revenues). EPA acknowledges that a change in one of these three inputs would lead to a different revenue estimate. However, EPA believes that it used the best information available at the time. Generating capacities were developed using information derived from the NEWGen database. EPA estimated capacity utilization by fuel type using forecasts from the Energy Information Administration's (EIA) Annual Energy Outlook 2001. Finally, EPA used a national price of generation, excluding transmission and distribution charges, forecasted by the U.S. Department of Energy's Policy Office Electricity Modeling System (POEMS). The generation price reflects the amount of revenue plants are likely to receive in a deregulated electricity market in which transmission and distribution services are separated from the generation function. POEMS forecasts electricity prices for several years into the future under a reference case and a competitive case. For the final analysis, EPA took the U.S. average of six forecasted prices: the projections for 2005, 2010 and 2015, each under the reference case and the competitive case. Based on this approach, the results of the annualized compliance cost to revenue analysis reveal that cost-to-revenue ratio for the new electric generators are very low for the majority of new plants. EPA also conducted a sensitivity analysis on revenues using the forecasted electricity prices for 2005, 2010, and 2015 under the reference and competitive cases for the NERC region with the lowest prices. This sensitivity analysis

resulted in similarly low impacts. Based on this analysis, EPA concludes that compliance with this regulation is both economically practicable and achievable.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Tim S. Shawver

On Behalf Of:

Duke Energy

Author ID Number:

316bNFR.042

Note

Fully supports the comments made by UWAG (316bNFR.068), EPRI (316bNFR.056), and EEI (316bNFR.069)

Comment ID 316bNFR.042.001

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Tim S. Shawver

Organization Duke Energy

The proposed rule is highly complex and covers a wide range of legal, technical, scientific and economic subjects. The factors that affect entrainment and impingement are site-specific, species-specific, and consequently widely varied. A one-size-fits-all categorical definition based on location of the intake structure, volume of water withdrawn, and intake velocity, is not realistic or practical in the real world.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes specific capacity, velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment of fish, shellfish, eggs, and larvae and requires the applicant to select and implement design and control technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish and shellfish. Track II allows the facility to conduct a comprehensive demonstration study to show that alternative controls will meet the same impingement and entrainment reduction levels that would be achieved by a shoreline intake meeting the Track I requirements at the same site.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.042.002

Subject Matter Code	7.1

Definition: New Facility

Author Name Tim S. Shawver

Organization Duke Energy

Definitions on new and existing facilities need clarity

EPA says in the preamble that its intention is to cover only new "greenfield" facilities. Duke Energy has concerns that the proposed rule would inappropriately be applied to "modernization" projects at existing power plant "brownfield" sites. The EPA reference to "new sources" and "new dischargers" muddles this intent, because the criteria cited could be expansively interpreted to cover significant modifications or expansions of existing facilities.

The definition of "new facility" fails to draw necessary distinctions between an entirely new facility built on a previously undeveloped site, and a replacement facility built on the site of an existing facility that is being shut down. If a new facility on a previously undeveloped site draws any water from a waterbody, the net effect of the new facility would increase the amount of water being used. In contrast, the shutdown and replacement of an existing facility frequently will drastically reduce the amount of water being used, especially when an older steam plant with once-through cooling is retired and replaced with a new combined-cycle plant.

By treating both "greenfield" and "brownfield" facilities identically as "new facilities," the proposed rule foregoes creating any incentive to encourage development that yields a net reduction rather than a net increase in water use. In contrast, EPA's rules implementing the Clean Air Act's Prevention of Significant Deterioration (PSD) program expressly recognize that emission reductions resulting from the shutdown of an older facility can be netted against the new emissions from a replacement facility on the same site to avoid triggering New Source Review (NSR) permitting requirements. For these reasons, the replacement or repowering of an existing facility should not be considered a "new facility."

EPA Response

EPA has defined a new facility in a manner consistent with existing NPDES definitions addressing new sources and new dischargers. Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule. Thus, the rule does not create a disincentive for development that yields a net reduction in water use.

Also, see response to 316bNFR.041.016.

Comment ID 316bNFR.042.003

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

Author Name Tim S. Shawver

Organization Duke Energy

Evaluation of economic impact is underestimated

EPA's analysis of the impact and economic costs of the proposed rules appears to be underestimated. Duke Energy alone has 13,500 megawatts in advanced development scheduled for commercial operation by the summer 2003. We realize than in this new competitive atmosphere of the deregulated electric power industry, construction plans are confidential and thus, accurate information regarding planned new facilities is often difficult to obtain. However, without accurate power plant projections, an accurate assessment of the cost implications of this rule cannot be developed.

EPA Response

EPA disagrees with the commenter's claim that EPA's analysis underestimates the impact and economic costs of the proposed rules. The commenter states that "Duke Energy alone has 13,500 megawatts in advanced development scheduled for commercial operation by the summer 2003." EPA reviewed the updated NEWGen database (February 2001 version) used for the final rule analysis and found that this database identified more capacity (approximately 19,000 MW) being developed by Duke Energy between 2001 and 2003 than Duke Energy cites. (This additional capacity is most likely attributable to facilities that are not in "advanced development" according to Duke Energy, but are being tracked by RDI.) EPA therefore believes that the NEWGen database provides a good basis for EPA's analysis.

EPA also disagrees with the commenter's claim that EPA did not accurately project new power plants. Since the proposal analysis, EPA has updated and expanded its research in order to reflect the most recent data available. EPA used total steam electric capacity forecasts by the Energy Information Administration's Annual Energy Outlook 2001 (AEO2001) as the basis for its analysis.

For combined-cycle facilities, EPA determined the in-scope rate and cooling water use characteristics using the February 2001 version of NEWGen Database. Compared to the January 2000 NEWGen database used for the proposal analysis, the newer version contains more than twice the number of new projects (941 compared to 466). EPA researched more than three times as many greenfield or stand-alone combined-cycle facilities (320 compared to 94) and obtained cooling water source information on almost four times the number of combined-cycle facilities (199 compared to 56). In addition, EPA believes that the much larger number of combined-cycle facilities identified as meeting the in-scope criteria of the final section 316(b) New Facility Rule (57 compared to seven) will provide a more robust and representative basis for estimating the characteristics (including size and cooling system type) and costs of new in-scope combined-cycle facilities.

For new coal facilities, EPA used information from the section 316(b) Industry Survey of existing facilities to project water use characteristics. EPA used information on coal facilities built during the last 20 years to reflect more current trends.

EPA believes that the data sources used in the final rule analysis are the most comprehensive currently available, and thus provide a reliable estimate of the number and cooling water characteristics of new in-scope electric generators. For an in-depth discussion of EPA's analysis, see Chapter 5: Baseline Projections of New Facilities in the Economic Analysis document.

Comment ID 316bNFR.042.004

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Tim S. Shawver

Organization Duke Energy

Proposed monitoring will delay development – pre-existing data should be used

The demand for power is projected to continue increasing in the next decade. The proposed regulation comes at a time in the electric utility industry when new source planning is necessarily compressed to assure profitability and to bring on line power to fuel this growing U.S. need for electric power.

The steam electric utility industry has over 25 years' experience in the design and implementation of pre-operational and post-operational entrainment and impingement monitoring. Based on that experience, EPA has underestimated the amount of time required to design, implement and analyze a year-long sampling program. The additional time is significant to members of the electric utility industry because the resulting construction delays may threaten the availability or price structure of electricity in certain areas.

The power industry has the responsibility to make sure electricity is available, reliable, and affordable. In parts of the country this past summer, there were well-publicized power shortages. In fact, in the San Diego area, consumer electricity bills doubled in the summer of 2000 – the power demand outstripped the supply, as new power plant permitting underwent delays.

The length of time for development of the Baseline Biological Characterization will likely be much longer than EPA estimates, and will significantly delay the NPDES permitting process. EPA's proposed rule does not prioritize use of preexisting data, as it should. For many major waterbodies on which electric generating stations are already sited, qualitative information on aquatic species should already be available. This preexisting data should be used whenever possible.

EPA Response

See Response to Comment 316bNFR.536.014.

Comment ID 316bNFR.042.005

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Tim S. Shawver

Organization Duke Energy

Site-Specific Approach

A site-specific approach to S. 316(b) is essential. A one-size-fits-all categorical definition based on location of the intake structure, volume of water withdrawn, and intake velocity, is not realistic or practical in the real world. Regional differences in meteorology, topography, and hydrology greatly influence siting a new power plant and technology suitable for one area of the country may not make sense in another. In addition, an approach that does not account for the multitude of site-specific factors that affect impingement and entrainment of aquatic organisms is not defensible from a scientific standpoint.

EPA Response

See response to comment 316bNFR.008.007and the preamble to today's rule.

Comment ID 316bNFR.042.006

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Tim S. Shawver

Organization Duke Energy

Underlying these proposed categorical rules is a simplifying assumption that entrainable eggs and larvae and impingeable fish are concentrated in certain areas (estuaries and the "littoral zone") and that they are uniformly distributed through the water column. Environmental data collected over the past 25 years indicates that this is not the case and is explained in further detail in comments filed by the UWAG, EEI and EPRI.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA did not vary the performance requirements based on waterbody type because it found problems in defining and implementing a littoral zone approach and decided to require reduction of impingement and entrainment on fresh water bodies to the same level as in estuaries and oceans. EPA has determined this approach to be technically feasible and economically practicable.

See response to comment 316NFR.006.005.

Comment ID 316bNFR.042.007

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Tim S. Shawver

Organization Duke Energy

Definition of Adverse Environmental Impact (AEI)

The first step in a S. 316(b) determination should be the determination of whether or not an Adverse Environmental Impact (AEI) is occurring, or is likely to occur with the construction and operation of a cooling water intake structure at a new facility. The EPA's proposed rule does not define AEI. This is a fundamental flaw because without a definition, it is impossible to determine Best Technology Available (BTA) requirements.

One of the Agency's proposals is to define AEI as the impingement and entrainment of organisms. This "one fish standard" is overly simplistic and ignores a number of factors that could determine whether or not an impact due to a cooling water intake structure is in fact adverse.

For example, in southeastern U.S. reservoirs, it is not uncommon for state resource management agencies to stock "exotic" or non-native fish species for recreational purposes. Often, the forage fish population is sub-tropical and cannot survive cold winter temperatures. Forage fish living outside of the thermal discharge area are highly susceptible to stress, weakening, and die-offs resulting from cold-shock. During this period, they are also more susceptible to being impinged or entrained because of their weakened condition. Once-through power plant cooling systems are actually beneficial in these circumstances because they provide an over-winter refuge for these forage species. Those that do survive the cold winters have such a high fecundity that they easily re-populate during the spring spawning period and the cycle starts over. This ability to compensate for the high degree of mortality experienced during the winter would be totally ignored by EPA proposed rule. Instead, the EPA would argue that severely weakened or dead fish being collected at the intake structure is an adverse impact. From a scientific standpoint, this argument does not make sense and would be counter to goals of the state resource management agencies. This also points out the need for a rule based on site-specific conditions.

A reasonable definition of AEI should be based on the consideration of all important environmental factors and focus on the overall health of representative species on a population and community level, and not just on numbers of organisms impinged or entrained. A full discussion of this issue, as well as possible definitions, can be found in comments filed by UWAG, EEI and EPRI. We refer the reader to those comments for additional information.

EPA Response

Please see responses to comments 316bNFR.507.004 and 316bNFR.025.010.

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses

and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). EPA acknowledges that cold-shock die-offs occur, but believes these are sporadic phenomena. Today's rule seeks to minimize entrainment and impingement of live organisms and is not intended to include fish that are dead or dying. Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Comment ID 316bNFR.042.008

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Tim S. Shawver

Organization Duke Energy

Proposed Generic Performance Standards

In the draft regulations for new cooling water intake structures, EPA lays the groundwork for prescriptive, numerical, performance standards to determine BTA requirements. Examples include:

- An intake flow threshold of 2 million gallons per day.
- An intake flow of no more than the lower of 5% of the source waterbody mean annual flow or 25% of the 7Q10 for freshwater rivers and streams.
- Protection of greater than 99% of the aquatic community.
- A 1% volume limit for cooling water intake structures located in estuaries and tidal rivers.
- A proposed through-screen velocity standard of 0.5 feet per second.

These proposed performance standards are extremely conservative and are not based on any credible scientific studies. Numerous examples of why these standards are scientifically illogical can be found in comments filed by UWAG, EEI, and EPRI.

As stated previously, the BTA determination for new cooling water intake structures should be made on a site-specific basis taking into consideration whether or not an AEI is occurring, or is likely to occur. A BTA determination should not be based on arbitrary, one-size-fits-all performance standards that are not based on sound science.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes specific capacity, velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment of fish, shellfish, eggs, and larvae and requires the applicant to select and implement design and control technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish and shellfish. Track II allows the facility to conduct a comprehensive demonstration study to show that alternative controls will meet the same impingement and entrainment reduction levels that would be achieved by a shoreline intake meeting the Track I requirements at the same site.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

EPA does not believe the statute compels EPA to determine first whether an AEI is occurring. Instead the statute authorizes EPA to minimize impingement and entrainment at new facilities by establishing requirements that the record demonstrates are technically available and economically

achievable at new facilities. All of the Track I requirements can be technically met by new facilities and are economically practicable for new facilities as a whole.

Comment ID 316bNFR.042.009

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Tim S. Shawver

Organization Duke Energy

The Role of Environmental Restoration

EPA is considering a wide variety of mandatory, discretionary, and voluntary regulatory approaches involving restoration measures. Restoration alternatives might include, but are not limited to, creating or improving wetlands, operating or funding fish hatcheries or stocking programs, protecting or enhancing fish habitat, and removal of barriers to fish migration. We agree that restoration activities can offer, in some instances, the best alternative for all interested stakeholders by maximizing benefits to the environment in a cost-effective manner. However, we believe that for restoration activities to be successful and work in the most cost-effective manner, they must be done on a voluntary basis; and not mandatory as the EPA has suggested.

EPA Response

See response to comment 316bNFR.024.004 and preamble sections V.B.2.f and V.L for discussions on restoration measures in today's final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Bill Wemhoff & Bill Neal

On Behalf Of:

American Public Power Assn. & Large
Public Power Council

Author ID Number:

316bNFR.043

Note

Fully supports the comments made by UWAG (316bNFR.068)

Comment ID 316bNFR.043.001

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

Public Power is submitting comments on this proposed rulemaking for a number of reasons. Public Power owns and operates electric generating facilities in almost all states. Many of these facilities utilize cooling water intake structures as part of their operations. These proposed regulations will directly impact many Public Power entities and their customers. Public Power has an obligation to provide reliable electric power at a reasonable cost. These proposed regulations will have a direct impact on their ability to do so.

Public Power supports the goal of minimizing the environmental effects of cooling water intake structures on the local ecosystem. It recognizes that it is necessary and reasonable for the federal government to explore means of achieving this objective. However, Public Power believes that this goal is best achieved by employing a holistic approach. Minimization of the environmental impacts of cooling water intake structures requires a balancing of environmental protection with the obligations Public Power has to the local communities which own and are served by these entities. Public Power also believes that federal regulation should preserve the rights of states to create appropriately designed programs tailored to protect those resources, habitats, and species with which states are intimately familiar and in which they have a vested interest. Likewise, as a member of the community, Public Power is uniquely situated to understand priorities and concerns as they relate to the usage and protection of local water bodies.

Public Power urges EPA to retain flexibility in the regulation of cooling water intake structures. Accordingly, we believe that the permitting process should account for, if appropriate, the unique nature of each waterbody and its ecosystem. Public Power believes that for this reason, national standards are not the preferred alternative. Rather, facilities must be evaluated on a case-by-case basis in order to achieve the desired environmental benefits while taking into account costs and impacts on the community. This will be especially true as the regulation of existing sources proceeds.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of also allowing flexibility to allow for technology appropriate to site-specific conditions by including a performance-based alternative.

For new facilities subject to this rule EPA chose the two-track option as the Agency believes it represents the best technology available for minimizing adverse environmental impact. For a discussion on cost impacts see the Economic Analysis.

Comment ID 316bNFR.043.002

Author Name	Bill Wemhoff & Bill Neal
Organization	American Public Power Assn. & Large Public Power Council

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

* The new rules should include provisions that provide for a site-specific assessment of individual sites where CWISs will be placed. This need not be the exclusive means of making a § 316(b) decision, but it should be one option available to the permittee.

* As an alternative, available in conjunction with the site-specific approach, it would be appropriate for EPA to recognize that certain CWIS technologies will minimize appreciable risk of adverse environmental impacts (AEI) in most cases. Therefore, EPA could authorize permit writers to use streamlined procedures to make site-specific "best technology available" (BTA) decisions more expeditiously, where the approved technologies or characteristics are present.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. Track I of the two-track approach provides an incentive -- through faster permitting and certain permit conditions -- for implementing effective control technologies. Track II offers flexibility for new facilities to consider site-specific factors while ensuring performance comparable with Track I.

Comment ID 316bNFR.043.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

* The concerns of local and regional communities should be respected and considered in making a determination under section 316(b). Public Power believes that EPA should encourage and respect the role of state governments and local interests in the process.

EPA Response

EPA agrees that state governments and local interests should be involved in the determination process under section 316(b). EPA has worked with stakeholders from the public interest groups and state agencies in the development of this final rule. In addition, EPA has considered all comments received from state governments and public interest groups during the comment periods of the original proposal, the NODA, and the reopened comment period for certain documents referenced in the NODA. EPA also met with the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA) and, with the assistance of ASIWPCA, conducted a conference call in which representatives from 17 states or interstate organizations participated.

The final rule recognizes that a State may, under sections 401 or 510 of the CWA, ensure the inclusion of any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure at a new facility that are necessary to ensure attainment of water quality standards, including designated uses, criteria, and antidegradation requirements. In addition, States that are NPDES authorized will be more involved in the determination process for those facilities that choose to comply with Track II requirements. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in a reduction of impingement and entrainment to a level comparable to the level achieve at the cooling water intake structure under Track I.

Comment ID 316bNFR.043.004

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 9.4

Adverse Environmental Impact

* As the fundamental purpose of Section 316(b) is to minimize "adverse environmental impact," regulations that look to achieve this objective cannot be implemented in the absence of a definition of or establishment of criteria for determining "adverse environmental impact." Therefore, Public Power believes that EPA should establish this essential definition or establish criteria to be used in making the determination.

EPA Response

Please see response to comment 316bNFR.802.013.

Comment ID 316bNFR.043.005

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 2.2

Obligation Under 316(b)

Section 316(b) authorizes EPA to only regulate cooling water intake structures, not entire cooling systems, and technologies should not be eliminated as a result. Public Power believes that once-through cooling is a viable technology that should remain an option for generation facilities. Once-through cooling systems are the most economical to construct, allow for more efficient power generation, and have an important environmental benefit not considered by EPA – namely its non-consumptive use of water. Public Power believes that the 316(b) regulations should provide facilities with the ability to make decisions on the type of cooling water system to be employed and should not eliminate viable technologies.

EPA Response

EPA's authority to regulate the flow of water as a measure of capacity is discussed in Response to Comment 316bNFR.205.002. EPA has established requirements based on capacity in order to reduce impingement and entrainment of aquatic organisms. EPA has documented the effects of entrainment and impingement from once through systems in the record for this rule. At the same time, it may be possible in some locations for alternative systems to be used if they result in comparable reductions in impingement mortality and entrainment to the same level as would be achieved by the Track 1 requirements. See also the preamble to the final rule. EPA considered the water use tradeoffs between once trough cooling and wet cooling, see response to comment 316bNFR.068.100.

Comment ID 316bNFR.043.006

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

* The legislative history of § 316(b) makes clear that costs must be considered in deciding what intake structure technology is the "best available." Public Power urges EPA to use a reasonable and verifiable cost estimate in determining "best technology available" as well as determining the impact of the proposed regulations.

EPA Response

EPA agrees with the commenter that costs should be considered in establishing BTA. EPA has adopted the cost to revenue test for determining economic practicability. For more detail please see response to comment 316bNFR.206.014 in comment category 10.11 and the preamble to the final rule.

EPA is confident that it has used reasonable and verifiable cost estimates in determining BTA and estimating the impact of the final rule. For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. EPA determined economic practicability by using the most current data available in considering the cost of compliance as compared with the revenue of a facility. For electric generators, EPA also considered initial compliance costs compared to the overall construction costs for a new facility.

Comment ID 316bNFR.043.007

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 23.4

Other Requirements (UMRA, RFA, SBREFA)

* The proposed regulations may significantly impact smaller entities. Public Power urges EPA to adequately consider these impacts by conducting a full review of the costs and impacts of various regulatory alternatives on small entities, as required under the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) and select the alternative that minimizes these impacts.

EPA Response

In accordance with the Regulatory Flexibility Act (RFA), EPA has considered the effects of the final section 316(b) New Facility Rule on small entities. For a detailed discussion, please see the response to comment 316bFNR.012.005 above.

Comment ID 316bNFR.043.008

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 15.11

Mandatory Approaches

* Public Power believes that EPA does not have the authority to mandate the use of mandatory mitigation measures or continuous monitoring. However, Public Power does believe that there is a role for voluntary mitigation measures as an alternative option for the minimization of adverse environmental impacts.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.043.009

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Bill Wemhoff & Bill Neal

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EPA's Approach to Regulation of Cooling Water Intake Structures Should Be Founded on A Site-Specific Approach

A site-specific approach to § 316(b) is essential. Public Power does not believe the approach advocated in the proposed rulemaking provides the best means of minimizing adverse environmental impact. Moreover, the inflexible, one-size-fits-all approach does not respect the complexities inherent in facility development and siting. Finally, this approach does not respect state and local concerns and does not encourage involvement of the community in the process. It is possible that this approach will, in fact, limit some sensible and proven solutions to impingement and entrainment and prevent the development of creative solutions to site-specific conditions, particularly so where water use and availability are of concern.

Public Power believes that what is needed instead is a site-specific approach that takes account of the complexity of aquatic communities and the local specifics of bottom substrate, bank, vegetation, depth, and flow at specific sites, along with technological feasibility and cost, and implications for other environmental media (that is, air and solid waste). The evaluation and siting of a facility should be made on a holistic basis, incorporating considerations relating to water quality, impact on the ecosystem, air emission contributions, and local community issues. The current proposal will prove to be expensive and will not provide the result desired by all – that is the minimization of impacts on the local ecosystem. The potential for a CWIS to cause "adverse environmental impact" is inherently site-specific, as are the technological alternatives for addressing the impact. Facilities that use cooling water will be sited on different types of waterbodies, each with its own physical characteristics (flow, substrate, shoreline) and its own variety of plants and animals. Even very similar facilities on the same reach of a river can have different impacts, depending on various site characteristics, how the intake is designed, and where it is placed in relation to where the fish breed and how they behave.

A case-by-case determination respects the objectives and interests of local, state, and regional communities. As entities which are owned by and service the communities in which they are based, Public Power believes that this is an essential component in the permitting process and should not be eliminated. The needs of all utilities are different. Intake structures whether new or existing have unique characteristics, as do the local communities. For example, Public Power entities located in Florida are currently required to incorporate a Manatee Protection Program into their NPDES permit. Oftentimes, these programs contain requirements on flow, temperature, and facility operation – requirements, which may be contradictory to the standards developed under this proposed rule.

EPA Response

See response to comment 316bNFR.008.007, 316bNFR.068.007, 316bNFR.068.008, and the preamble to today's rule.

Comment ID 316bNFR.043.010

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

There may be some logic to establishing technology-based standards for new facilities and it may provide increased certainty in the planning process. Public Power believes that such an approach could be structured as an alternative available to the source. In line with this view, Public Power believes EPA should explore development of a tiered approach as explained below. It may be possible, for example, to establish a range of acceptable velocity levels and provide guidance on other types of acceptable controls. This approach may indeed be workable for some facilities and Public Power would support its availability as an alternative. Public Power does not, however, in supporting this alternative, abandon any challenges it may have to EPA's authority to regulate flow or water quality through section 316(b).

Public Power would endorse and support a tiered, dual option approach to the regulation of cooling water intake structures. Public Power believes that the regulations must include the option for a site-specific approach. Under this system, the regulators and permitee would first whether a proposed CWIS is reasonably likely to create an "adverse environmental impact" (AEI) at that location. If so, they (the permittee and regulator) would determine which among the "available" CWIS technologies for a given site is the "best" (that is, BTA), given their associated benefits and costs. As part of this process, applicants would have to collect data and, as necessary, do additional studies to assess the potential for AEI. Where the reasonable potential for AEI exists, permittees also would evaluate the availability, costs, and benefits of alternatives. However, in order for this approach to be workable, Public Power believes that EPA must provide guidance or rules on a definition for AEI, criteria to be used in selecting BTA, and what cost-benefit analysis is appropriate.

As part of a dual option approach, EPA could also structure regulations to include a second alternative for sources that would allow facilities to seek an expedited determination from the permitting authority. Under this approach, EPA could identify technologies or characteristics which would be considered to be "highly protective of aquatic resources." The permittee would have the option of incorporating these technologies or characteristics into its facility and/or CWIS, at which time it would receive a determination by EPA or the permitting agency that § 316(b) is satisfied. In this manner, facilities could choose more restrictive technologies in return for greater certainty and perhaps reduced costs, since the need for expensive pre-permit studies would be eliminated.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. The two-track approach is similar to the dual option described by the commenter, however, because all cooling water intake flow results in the potential for impingement and entrainment, EPA did not

adopt an approach in the final rule that focuses primarily on assessing whether AEI is occurring. Rather, the rule establishes technology-based performance requirements and offers new facilities the option of meeting the required levels of performance through the use of those technologies that most effectively reduce harmful environmental impacts at their site.

Comment ID 316bNFR.043.011

Subject Matter Code EXIST

Existing Facility Rule

Author Name Bill Wemhoff & Bill Neal

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It should be emphasized that for existing structures, such technology-based standards are problematic. It is difficult, if not impossible, to establish a “one-size fits all” for existing structures on a cost-effective basis. For existing structures, a clear definition of adverse environmental impact will be key because it will be the only way in which impacts may be assessed and the appropriate technology determined. As such, Public Power does not support a technology-based approach for the upcoming rulemaking for existing structures but rather believes, again, that a site-specific approach must be included.

EPA Response

Today's rule addresses only new facilities. Existing facilities will be addressed in the next phase of this rulemaking.

Comment ID 316bNFR.043.012

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 9.4

Adverse Environmental Impact

A Prerequisite To Regulation is the Need to Define Adverse Environmental Impact

EPA has not defined "adverse environmental impact" in this proposed rule, despite the fact that it requires permit writers and permittees alike to do site-specific evaluations and develop additional measures based on the need to minimize AEI. See 65 Fed. Reg. 49,074-75. It discusses a number of possible definitions, including "1% of organisms susceptible to the CWIS" and the "one dead fish" test. EPA says that it may publish one of the listed alternative approaches to AEI as "guidance" or leave the term undefined.

Public Power believes that it is essential for adverse environmental impact to be defined. The basic underpinning of the statutory provision is that the adverse impacts on the environment be minimized.

EPA Response

Please see response to comment 316bNFR.009.001.

Comment ID 316bNFR.043.013

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 9.44

Request for Comment: Definition of AEI

Public Power would suggest a definition of "adverse environmental impact" which incorporates the following concepts:

Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function and (2) is attributable to the operation of the cooling water intake structure.

EPA Response

Please see response to comment 316bNFR.069.008 and the preamble to the final rule for discussion of the issues raised in this comment.

Comment ID 316bNFR.043.014

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 9.4

Adverse Environmental Impact

Without a definition of AEI, the decisions facing regulators and permittees become increasingly complex and their outcome more uncertain. EPA may indeed be accused of unbounded discretion that would violate several principals of environmental law, including the non-delegation doctrine. Public Power believes that the definition should also include a list of factors to be used in evaluating AEI.

EPA Response

Please see response to comment 316bNFR.536.011.

Comment ID 316bNFR.043.015

Subject Matter Code EXIST

Existing Facility Rule

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

For existing structures, this definition becomes critical. Technology-based standards are problematic and it is difficult, if not impossible, to establish "one-size fits all" for existing structures. A clear definition of adverse environmental impact will be key because it will be the only way in which impacts may be assessed and the appropriate technology determined.

EPA Response

See the preamble to the final rule for an explanation of an Adverse Environmental Impact and elsewhere in this comment response document. See response to comment no. 316bNFR.030.001. EPA will be addressing existing facilities issues in Phase II of this rulemaking.

Comment ID 316bNFR.043.016

Subject Matter Code	7.1
Definition: New Facility	

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

Ambiguity in the Definition

EPA has stated that the proposed rule is only intended to apply to "greenfield" and "stand-alone" facilities. 65 Fed. Reg. 49,066 col. 1. However, the proposed rule also states that it applies to "new facilities," and goes on to define "new facility" to mean a "new source" or "new discharger" as defined in 40 C.F.R. §§ 122.2 and 122.29(b)(1), (2), and (4). 65 Fed. Reg. 49,116 col. 3. Section 122.29 includes criteria for new source determinations that covers any source (1) which "totally replaces the process or production equipment that causes the discharge of pollutants at an existing source, or (2) has processes "substantially independent of an existing source at the same site." See 40 C/F.R. 122.29(b)(1)(2). These references to "new sources" and "new dischargers" are confusing and may cause the regulations to be misinterpreted. When read together, the regulations could be interpreted to apply to the modification or expansion of existing facilities. In addition, repowered units could be encompassed within this definition. Public Power, therefore, urges EPA to address these concerns by clarifying the definition of "new facility," eliminating the contradictions, and stating clearly what is meant by "substantially independent." EPA has continually stated that it intends this regulation to only cover greenfield and stand-alone facilities. Therefore, this intent should be clearly stated and these confusing, contradictory definitions should be eliminated.

EPA Response

See response to 316bNFR.030.003.

Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. Thus, the definition of a new facility in the final rule applies to a facility that is repowered only if the existing facility has been demolished and another facility is constructed in its place, but modifies the existing cooling water intake structure to increase the design intake capacity. In this way, the rule allows for numerous types of changes to existing facilities, while defining new facilities in a manner consistent with existing NPDES definitions addressing new sources and new dischargers.

In this rule EPA does not believe it is appropriate to further define the phrase "substantially independent" as used in 122.29(b)(1)(iii). Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether ... processes are substantially independent, the

Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." EPA believes this is sufficient and promotes consistency within the NPDES program.

Comment ID 316bNFR.043.017

Subject Matter Code	7.1

Definition: New Facility

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

There is some ambiguity in the transition point for new facilities or recently constructed facilities. Although a facility will not be subject to these proposed regulations if it is constructed prior to the implementation date of the regulation, it is unclear what standards and criteria will apply to facilities under construction or recently constructed. As a result, there is a significant gap in the regulatory structure. Public Power would urge EPA to clearly state that these facilities are not subject to the proposed new facility rule. In addition, EPA should clearly state that the proposed rule for existing facilities will not serve as a template for the later rule for existing facilities. To the extent that aspects of the new source rule are being considered for inclusion for the proposed existing source rule, EPA should clearly identify them and provide newer facilities with some certainty.

EPA Response

The Agency chose the commencement of construction date because it was generally consistent with the term "new source" in the existing NPDES permitting regulations and it should provide adequate notice and time for facilities to implement the technological changes required under the rule. The date a facility commences construction is clarified at 40 CFR 122.29(b)(4). This provision describes certain installation and site preparation activities that are part of a continuous onsite construction program; it includes entering into specified binding contractual obligations. Thus, under today's rule facilities that are constructed or commence construction within the meaning of 40 CFR 122.29(b)(4) prior to or on the effective date of the final rule are not new facilities. Such facilities may be addressed under the Phase II or III rules. Those that commence construction after the effective date of this rule and meet the other regulatory thresholds defined in § 125.81 are subject to the requirements of this rule.

This rule applies to new facilities. Existing facilities will be addressed under future rulemakings (i.e., Phase II and Phase III).

Comment ID 316bNFR.043.018

Subject Matter Code	7.1
Definition: New Facility	

Author Name Bill Wemhoff & Bill Neal

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Problematic Use of "Routine Maintenance" as Litmus Test

In the proposed rule, the Preamble states: "Routine maintenance and repair to an intake structure which is currently withdrawing cooling water and does not result in an increase in design capacity is not considered a modification. Facilities that meet the conditions of 40 CFR 122.29(b)(3) would be considered to be undergoing a modification and would not be considered a 'new facility' under these regulations." 65 Fed. Reg. at 49066, col. 2. The use of this criteria, in other statutory structures, has proved to be problematic for the utility industry. Therefore, Public Power requests that EPA provide criteria and/or a definition of "routine maintenance" in this rulemaking to provide meaningful guidance to facilities as they seek to comply with these requirements.

Public Power believes that many activities could potentially be construed to not be "routine maintenance." It is unclear, for example, whether work done which changes the capacity or velocity would be captured under this definition. In addition, the current proposal states that a modified cooling water intake structure is one that has some part of the intake, including the pumps, changed, replaced, or expanded to accommodate, in whole or in part, a new facility's water usage. 65 Fed. Reg. 49,066 col. 1-2. The circulating water pumps typically are not included as part of the CWIS and it is common practice in the electric utility industry to change out pumps and other equipment periodically. Such equipment gets hard use and must be replaced from time to time, to maintain capacity and prevent head loss. When one or more pumps is replaced, it may not be possible to find the exact same pump, or the same vintage. Or, it may be desirable to replace the pump with a newer model that is more flexible, efficient or durable. EPA should clarify that replacement of existing pumps in and of itself does not trigger the application of these requirements, even if a new facility subsequently hooks in behind the pumps. Public Power urges EPA to provide clear guidance on what is considered to be "routine maintenance."

EPA Response

EPA has not defined "routine maintenance" in the final rule because clarifying what constitutes routine maintenance is not vital to the definition of new facility. Under the new facility rule, to be considered a new facility a facility must be a new source or new discharger and use a newly constructed cooling water intake structure or a modified existing cooling water intake structure whose design intake has been increased. Thus, changes to a cooling water intake structure at an existing facility that is not a new source or new discharger are not subject to this rule. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule.

In the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the first intake pump or series of pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed. Section 316(b) authorizes EPA to impose limitations on the volume of the flow of water withdrawn through a cooling water intake structure as a means of addressing "capacity." In re Brunswick Steam Electric Plant, Decision of the General Counsel No. 41 (June 1, 1976). Such limitations on the volume of flow are consistent with the dictionary definition of "capacity," the legislative history of the Clean Water Act, and the 1976 regulations. Id. Indeed, as Decision of the General Counsel No. 41 points out, the major environmental impacts of cooling water intake structures are those affecting aquatic organisms living in the volumes of water withdrawn through the intake structure. (Statement of Mr. Buckley, Senate consideration of the Report of the Conference Committee [discusses intake from once-through systems]. A Legislative History of the WPCA Amendments of 1972, 93rd Cong., 1st Sess., Committee Print at 196, 197). Therefore, regulation of the volume of the flow of water withdrawn also advances the objectives of section 316(b).

Comment ID 316bNFR.043.019

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Bill Wemhoff & Bill Neal

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The Definition of CWIS Needs Clarification

In the proposed rulemaking, EPA has proposed defining cooling water intake structure (CWIS) as the total physical structure and any associated constructed waterways used to withdraw water from waters of the U.S. provided that at least 25% of the water withdrawn is used for cooling purposes. 65 Fed. Reg. at 49062. The regulation would establish requirements applicable to the design, location, construction, and capacity of each CWIS. Under the proposed definition, the CWIS extends from the part at which water is withdrawn from the surface water source to the first intake pump or series of pumps. 65 Fed. Reg. at 49066. However, although they are not within the generally accepted definition of cooling water structures, in this definition it is unclear whether the pumps are included in the CWIS. Public Power believes that EPA should clarify this definition, for this and other reasons.

In addition, the current definition includes, as part of the CWIS, "associated constructed waterways used to withdraw water." 65 Fed. Reg. at 49066. However, EPA does not define or explain this term and, as a result, it is unclear what will be included in the CWIS. For example, if a cooling pond is indeed a "water of the United States" (a point with which Public Power disagrees, for the reasons discussed below), would the cooling pond be an "associated constructed waterway" and thus an intermediate point in the CWIS, or would the CWIS begin at the point from which water is withdrawn from the pond?

EPA Response

In the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the intake pumps. The explicit inclusion of the intake pumps in the definition of cooling water intake structure reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed.

EPA has not defined the phrase "associated constructed waterway." The determination of whether a waterway is considered part of the cooling water intake structure can vary depending on the location, type of facility, and other factors. EPA has left this determination up to the permit writer who will evaluate each situation on a case-by-case basis. For purposes of this rule, an "associated constructed waterway" might include, but not be limited to, a cooling canal, intake embankment, or any waterway that directs water into the cooling water intake structure.

Comment ID 316bNFR.043.020

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

Cooling Ponds Should Not be Included as "Waters of the U.S."

EPA has stated that cooling ponds are considered "waters of the U.S." if they meet the criteria in 40 C.F.R. § 122.2. 65 Fed. Reg. 49,067 col. 2. As a result, new facilities that withdraw cooling water from cooling ponds that meet this definition and that otherwise meet the criteria of the new rule would be subject to this rule. Public Power does not believe that this should be the case. Man-made recirculating cooling ponds or cooling reservoirs provide an effective means to remove heat from electric generating facilities. In addition, they often are viewed as a valuable asset due to the aquatic habitat and recreational opportunities that they afford. Cooling ponds are multifunctional assets created solely as a result of the construction of a generating facility. If not for the construction of this facility, the waterbody would not exist. The beautification and addition of aquatic resources, such as fish stocking, are voluntary measures undertaken by the facility for the benefit of the community and local ecosystem. The facility should not, as a result of these regulations, be penalized for this development. As a result, Public Power strongly believes that cooling ponds should be excluded from the regulatory structure for the reasons stated below.

The criteria used to define waters of the United States are generally quite broad. A cooling pond or reservoir satisfies EPA's general definition of "waters of the U.S." in 40 C.F.R. § 122.2 if it is used in interstate commerce. As these assets are often enjoyed by both in-state and out-of-state visitors for fishing and recreation, they in effect support interstate commerce and therefore meet the criteria set forth in the definition at §122.2. However, the de facto classification of cooling ponds or cooling reservoirs as "waters of the U.S." is not the issue. But rather, the concern lies with the conditions that would be imposed on cooling water intake structures associated with these water bodies.

As proposed, cooling ponds or cooling reservoirs are encompassed in the broad definition of "reservoir," at §125.83, which "means any natural or constructed basin where water is collected and stored." "Reservoirs" and "lakes" are then grouped together as one of the four water body types under §125.84(a). And specific requirements for cooling water intake structures located in a "lake or reservoir" are set forth in sections §125.84(c)(1), (c)(2) or (c)(3).

Upon reviewing these specific requirements, it becomes readily apparent that cooling ponds or cooling reservoirs are unique and warrant separate attention. Most notable, under sections §125.84(c)(2) and (c)(3), pertaining to intake structures located less that 50 meters outside the littoral zone or within the littoral zone, respectively, a flow restriction would be placed on the intake "commensurate with that which can be attained by a closed-cycle recirculating cooling water system." This provision breaks down with respect to cooling ponds or cooling reservoirs, which under §125.83 meet the definition of a "closed-cycle recirculating system." <FN 1> Accordingly, the rule would have the flow of recirculating water, through the intake structure, equal the amount of water resupplied to the reservoir to make up for evaporative losses and blowdown. This is not possible. In fact, the intake flow from a cooling reservoir could only be reduced to such levels if it were providing "make up" water for another

closed loop recirculating system and not directly to the electric generating facility. Obviously, this would defeat the purpose of the cooling reservoir in the first place. Accordingly, flow restrictions should not be placed on intake structures located on new or existing cooling reservoirs or ponds.

As stated above, Public Power does not believe that cooling ponds should be included as “waters of the United States” and be regulated under these regulations. Cooling ponds are unique systems, created solely as a result of the construction of the generating facility. Public Power urges EPA to recognize the unique nature of these systems and exclude them from the regulations.

Footnotes

1 A Closed-cycle recirculating system “means a system designed, using minimized makeup and blowdown flows, to withdraw water from a natural or other water source to support contact and noncontact cooling uses within a facility. The water is usually sent to a cooling canal or channel, lake, pond or tower to allow heat to dissipate and then is returned to the system. New source water (makeup water) is added to the system to replenish losses that have occurred due to blowdown, drift, and evaporation.”

EPA Response

EPA has not categorically excluded new facilities that withdraw water from cooling ponds from the final rule. In certain circumstances, cooling ponds can be "waters of the U.S." See 40 CFR 122.2. Given that the Clean Water Act applies to and seeks to protect "waters of the U.S.," a categorical exclusion is not appropriate. The determination of whether a cooling pond is a "water of the U.S." is made on a case-by-case basis by the permitting authority through application of 40 CFR 122.2. See Response to Comment 316b.NFR.068.151.

In the final rule, EPA has de-emphasized the location of cooling water intake structures in different categories of waterbodies, removed the littoral zone concept, and established two alternative compliance tracks for all categories of waterbodies. The rule recognizes that cooling ponds can be part of a closed-cycle recirculating system if they are not "waters of the U.S."

Comment ID 316bNFR.043.021

Subject Matter Code	7.1
Definition: New Facility	

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

EPA Should Not Impose CWIS Restrictions on Structures Which Are Not Owned by the NPDES-Permitted Facility.

Public Power believes that EPA should not use the 316(b) rulemaking to regulate cooling water intake structures that are not owned by the NPDES-permitted facility. EPA has sought comment on how to handle facilities that use cooling water that is withdrawn through an intake structure controlled by a different party. These include facilities that use municipal water – drawn from waters of the U.S. – as their source of cooling water. 65 Fed. Reg. 49,069. Most treatment systems are designed and sized to treat a certain amount of raw water containing certain kinds and concentrations of pollutants. The cost of building and operating a treatment system typically is related to its size, among other factors. It may be difficult or impossible for a municipality or public power system to justify the substantial costs associated with building and operating a larger treatment system. This could have economic development effects for municipalities. Also, treating gray water sources as "CWIS" would provide a disincentive for re-use of treated water and exacerbate reliance on new surface water withdrawals which does not appear to be good public policy.

Finally, from a practical standpoint, it is not clear how a regulator would impose constraints on a third party. Public Power believes that § 316(b) requirements should only be imposed on those entities that own and operate their own cooling water intake structures.

EPA Response

The final rule applies only to new facilities that hold an NPDES permit or are required to obtain a permit. The Agency continues to believe that most new facilities that will be subject to this rule will control the intake structure that supplies them with cooling water and will discharge some combination of their cooling water, wastewater, and stormwater to a water of the U.S. through a point source regulated by an NPDES permit. Under this scenario, the requirements for the cooling water intake structure will be applied in the facility's NPDES permit. However, EPA has clarified in the final rule that use of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States. However, the use of cooling water does not include obtaining cooling water from a public water system. Thus, the use of municipal water originally withdrawn from waters of the U.S. does not constitute use of a cooling water intake structure. This clarification is intended to prevent circumvention of these requirements by creating arrangements to receive cooling water from an entity that is not itself a point source.

Comment ID 316bNFR.043.022

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

316(b) Authorizes the Regulation on Cooling Water Intake Structures, Not Entire Cooling Systems

In the proposed rule, EPA appears to set forth preferences for certain types of cooling systems. For example, one could argue that the proposed regulation demonstrates a clear preference for the use of cooling towers by generating facilities. However, section 316(b) does not provide EPA with authority to mandate the use of a particular cooling system. EPA's authority under § 316(b) is limited to regulating and placing restrictions on the cooling water intake structure, not in forcing a preferred system for cooling. Moreover, although cooling towers may utilize technologies that EPA finds beneficial, the overall system is not necessarily the one which is most responsive to the environment.

In a recirculating system, the cooling water is used to cool equipment and steam, absorbing heat in the process, and is then cooled and recirculated to the beginning of the system to be used again for cooling. The heated cooling water is generally cooled in either a cooling tower or in a cooling lake/pond. In the process of being cooled, some of the water evaporates or escapes as steam. Flow lost through evaporation typically ranges from 0.5% to 1% of the total flow. Also, as a result of evaporation, mineral concentrations build up in the recirculating water, which necessitates some bleeding of water from the system. The water that is purged from the system to maintain chemical balance is called blow down. The amount of blow down is generally around 1% of the flow. Cooling towers may also have a small amount of drift, or windage loss, which occurs when some recirculating water is blown out of the tower by the wind or the velocity of the air flowing through the tower. The water lost to evaporation, blow down, and drift needs to be replaced by what is typically called makeup water. Overall, makeup water is generally 3% or less of the recirculating water flow but may be as much as 15% for some salt water cooling towers Therefore, recirculating systems still need to draw in water and may have cooling water intakes, although some systems obtain their makeup water from groundwater sources or public water supplies, and a small but growing number are using treated wastewater from municipal wastewater treatment plants. In that the volume of water drawn in is significantly less than in once-through systems, the likelihood of adverse environmental impacts is also much lower. However, advanced technologies can be less efficient, resulting in resulting in an increased internal demand by the facility for electricity. This will, in turn, increase air emissions of NOx , SOx, PM, and CO2 due to the overall increase in fuel consumption and generation.

Accordingly, Public Power believes that these regulations should not dictate the type of cooling system to be used by the generating facility. Moreover, once-through cooling is a viable technology, which should not be eliminated as an option for facilities. It is generally a less expensive alternative, which provides more efficient power generation. As a result, it is an essential option for Public Power which has a mandate to provide cost-effective power to its customers and owners.

Another "technology" (though not an intake structure technology) that EPA is considering is dry cooling towers. However, there are significant challenges associated with dry cooling. First, they are very expensive, more costly even than wet cooling towers (by EPA's own estimates, they are over

three times the cost of cooling towers). Second, they require more energy than other cooling methods and therefore exact a large energy penalty from generating stations where they are used. This penalty also includes the burning of more fossil fuels, which in turn increases environmental costs such as air emissions. Finally, dry cooling towers may have operational difficulties and limitations that make them infeasible for many generating facilities. Also, it would be essential to make a decision to use dry cooling early in the planning process and would not be an option for existing facilities.

EPA Response

EPA's final rule for new facilities does not mandate one type of cooling system to be used, but rather establishes performance in terms of reduction of impingement and entrainment that must be met based on the performance of wet cooling towers. EPA finds that reduction of impingement and entrainment at this level is technically available, economically practicable and has acceptable non water quality environmental impacts. Other technologies that meet the performance requirements of the rule may also be used. EPA's authority to regulate the flow of water as a measure of capacity is discussed in Response to Comment 316bNFR.205.002. EPA has considered the environmental impacts of the rule including blowdown and incremental air emissions and has determined that they are acceptable. For a discussion of incremental air emissions, see the preamble to the final rule, the Technical Development Document and Response to Comment Document, e.g., 316bNFR.501.025. For discussion of blowdown, see Response to Comment Document, e.g. 316b.NFR.068.100. With respect to dry cooling, EPA explains the basis for rejecting dry cooling as the technology basis for the final rule in the preamble to the final rule and in the comment response document, e.g., 316b.NFR.006.007, 316b.NFR.053.010., 316b.NFR.206.014.

Comment ID 316bNFR.043.023

Author Name	Bill Wemhoff & Bill Neal
Organization	American Public Power Assn. & Large Public Power Council

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The Establishment of a Two Million Gallon Per Day Design Intake Flow Is Arbitrary and Does Not Further the Objectives of Section 316(b).

Public Power believes that the design intake flow limit proposed by EPA is an arbitrary cutoff and does not further the objectives of section 316(b). EPA has not provided any support for the establishment of a two million gallon per day (MGD) cutoff. Public Power believes that this threshold will impose unnecessary and unjustified costs on smaller entities or on entities which are already incurring significant costs due to the inclusion of cooling towers in their system, designed, in part, to minimize any adverse environmental impacts. If such limits are deemed to be necessary, Public Power would argue that a much higher threshold would be appropriate, perhaps 20 MGD. EPA's own estimates indicate that a 25 MGD threshold would subject up to 99.1 percent of all cooling water flows to the proposed rules, thereby achieving the overall objectives of the regulation.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities who could technically achieve and economically afford the requirements of the rule would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA has concluded that the compliance costs for this rule are economically practicable and achievable for the industries affected. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

For further discussion of these points, see Sections V, VI.A.3, and VIII of the preamble to the final rule.

Comment ID 316bNFR.043.024

Author Name	Bill Wemhoff & Bill Neal
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Subject Matter Code 7.4

Water Withdrawal threshold

Public Power would like to stress that, in general, we do not believe a standard flow threshold furthers the objectives of section 316(b). Public Power believes that a better determinate would involve an evaluation of the percentage intake of a water body used by a facility. This better serves to evaluate the effects and impacts on a particular water body. EPA has considered this alternative (65 Fed. Reg. at 49068) and Public Power believes it is a preferred alternative. Public Power would argue that an alternative that is representative of a de minimus level of total flow would provide greater flexibility and lessen the impacts on smaller entities.

EPA Response

EPA chose the two MGD threshold because this threshold addresses the majority of new facilities and therefore provides the States and Tribes with a national rule that can be easily applied to a majority of permitting decisions they face in order to implement the legal requirements of CWA section 316(b). No percentage flow threshold has been added to the applicability provisions; however, proportional flow limits exist in the rule. The proportional flow limits provide some capacity- and location-based protection to the source water body.

Comment ID 316bNFR.043.025

Subject Matter Code	24.2
EEA - Estimation of Unit Costs	

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The Economic Analysis Performed by EPA Severely Underestimates the Cost Implications of this Rulemaking

EPA's analysis of the impact and economic costs of the proposed rules is inadequate. In the first place, Public Power believes that EPA has underestimated how many new power plants will be subject to the new rule. EPA has identified 56 new/proposed facilities that will be affected by this rulemaking over the next ten years but surmises that only 12 will incur additional costs as a result of the proposed regulation. However, Public Power and others have found that the potential costs are much more significant. One member company projects that the additional cost incurred as a result of installing a cooling tower over once-through cooling is approximately $15 million on a 600 MW plant. Although the cost will be capitalized out over 30 years, there will also be an increase of $3 million in annual operational and maintenance costs associated with the cooling tower.

Public Power would urge EPA to undertake a reasoned analysis of how many facilities will indeed be built in the upcoming years and accurately assess the costs of this proposed regulation on these facilities. Due to the current uncertainties associated with this rulemaking, many Public Power entities have found that consideration of certain types of cooling systems is simply infeasible. Inclusion of a once-through cooling system in a facility will cause significant regulatory challenges, including increases in the costs of permitting and time for review. As a result, many facilities do not currently entertain the use of once-through cooling as a viable alternative, even in locations where future water shortages are anticipated. With this rulemaking, the Agency has a unique opportunity to "fix" this uncertainty and allow for such local issues as water availability to be addressed.

In addition, EPA has not adequately considered the increased costs associated with the testing and monitoring requirements imposed by the proposed regulation. Permitting studies associated with either cooling towers or dry cooling are extremely expensive as are the post operational studies suggested by EPA. Due to the short comment period, Public Power has not been able to adequately evaluate and assess the cost implications of these requirements but believes that such costs will significantly exceed the figures cited by EPA. The necessity for an accurate and valid cost assessment will be especially important for the later rulemaking on existing sources. Public Power urges EPA to conduct cost studies that address these concerns prior to imposing such additional, potentially costly requirements on generating facilities.

EPA Response

EPA has revised the number of electric generation facilities that would be subject to the 316(b) rule. EPA has used updated information from the February version of the NEWGen database, which shows a greater number of planned electric generation facilities compared to the January 2000 version and was used when the rule was proposed. Similarly, we have used the Annual Energy Outlook 2001.

EPA has expanded the sample of new electric generation facilities substantially to estimate the ratio of the facilities that would be subject to the rule on the basis of the NEWGen database. Similarly, EPA has revised the average size of a representative plant. As a result, not only the total number of future steam electric facilities, but also number of facilities subject to the rule, has increased significantly.

EPA has revised the cost of monitoring of impingement and entrainment. Similarly, it has revised the cost of the source water baseline biological characterization. For comments on other costing issues related to cooling towers, O&M, and the energy penalty, see Section VI.H in the preamble to the final rule and responses to 316bNFR.068.329, 316bNFR.068.330 and 316bNFR.068.332. Consequently, the cost of the rule has been revised significantly upward. (See the Economic Analysis) EPA designed the requirements of the final rule such that they minimize the cost in order to reduce impingement and entrainment of aquatic organisms. As a result of revisions, the presented cost for the final rule is reasonable.

Comment ID 316bNFR.043.026

Subject Matter Code	23.4
Other Requirements (UMRA, RFA, SBREFA)	

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Unfunded Mandate Reform Act Requirements

Under the Unfunded Mandate Reform Act (UMRA) of 1995, EPA must assess the effects of its regulatory actions on State, local, and Tribal governments and the private sector. EPA must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that might result in expenditures in the aggregate of $100 million or more in any one year. Before promulgating the rule, EPA is required to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule.

In its August 10 proposal, EPA states that it determined that its proposed rule does not contain a Federal mandate that might result in expenditures of $100 million or more. According to EPA's analysis, total annualized compliance and implementation costs are estimated to be $12.2 million per year (including direct compliance costs for facilities owned by government entities of $0.26 million). As previously pointed out, the cost savings per year for just one power plant with once-through cooling exceeds $3.5 million.

Public Power does not believe that EPA has adequately responded to the obligations imposed under this statute. Public Power believes that these regulations will impose significant costs on the generation of electricity, costs that must be passed along to customers and owners of Public Power. As a result, Public Power urges EPA, once again, to conduct a thorough and adequate review of the potential costs associated with this proposed rule. The annualized costs associated with the testing and monitoring requirements contained in this proposal could, alone, exceed the statutory threshold.

EPA Response

EPA disagrees with the comment that EPA has not adequately responded to the obligations imposed under the Unfunded Mandates Reform Act of 1995 (UMRA). Under section 202 of UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that might result in expenditures to State, local, and Tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year.

In accordance with the requirements of UMRA, EPA has determined that this rule does not contain a Federal mandate that might result in expenditures of $100 million or more for State, local, and Tribal governments, in the aggregate, or the private sector in any one year. Total annualized compliance and implementation costs are estimated to be $48 million. Of the total costs, the private sector accounts for $44 million and the government sector (includes direct compliance costs for facilities owned by government entities) accounts for $4 million. EPA calculated annualized costs by estimating initial and annual expenditures of facilities and regulatory authorities over the 30-year period (2001-2030),

calculating the present value of that stream of expenditures using a 7 percent discount rate. EPA estimates that the highest undiscounted cost incurred by the private sector in any one year is approximately $71 million and the highest cost incurred by government sector in any one year is approximately $19 million. Thus, today's rule is not subject to the requirements of sections 202 and 205 of UMRA.

For more detail on EPA's analyses addressing the requirements of UMRA, please see Chapter 9: Other Economic Analyses in the Economic Analysis document.

Comment ID 316bNFR.043.027

Subject Matter Code	23.4
Other Requirements (UMRA, RFA, SBREFA)	

Author Name Bill Wemhoff & Bill Neal

Organization American Public Power Assn. & Large Public Power Council

EPA Has Not Adequately Considered the Impact on Small Entities

The Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) requires EPA to prepare an analysis (meeting specific criteria) of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities (for a small government – those having populations of less than 50,000; or for small steam electric generators - those generating less than 4 million MWhrs annually). EPA simply states only 20 facilities owned by small entities would be affected by its proposal and that no small governments or nonprofit entities would be affected. The agency therefore certifies that its action will not have a significant economic impact on a substantial number of small entities. EPA also observes that even though the electric power industry is currently experiencing a rapid expansion and a large number of generating plants are under construction, the trend is away from using surface water for cooling and, therefore, the result is a low number of facilities impacted by the proposed rule.

Again, Public Power does not believe that EPA has fulfilled its obligations under this statute. EPA's cost estimates are extremely low and the Agency has underestimated the overall economic impact of this proposed rule. Public Power urges EPA to conduct a SBREFA review as required to assess the impacts of this proposed regulation on small entities.

EPA Response

EPA disagrees with the comment that it has not fulfilled the obligations under the Regulatory Flexibility Act (RFA). See response to comment 316bFNR.012.005 above.

In addition, the commenter asserts that "EPA's cost estimates are extremely low and the Agency has underestimated the overall economic impact of this proposed rule." Since the proposed rule, EPA has significantly expanded its research into the costs of the proposed rule. As a result, EPA has made adjustments to the unit costs as well as the number and characteristics of facilities subject to the final rule. EPA therefore is confident that the claim that costs estimates and economic impacts are underestimated is in error.

Comment ID 316bNFR.043.028

Subject Matter Code	15.11
Mandatory Approaches	

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EPA is Not Authorized to Impose Mandatory Monitoring and Mitigation Measures

EPA is considering a variety of mandatory, discretionary, and voluntary regulatory approaches involving restoration measures. 65 Fed. Reg. 49,089 col. 3. Restoration measures include creating or improving wetlands, operating fish hatcheries or stocking programs, and removing impediments to fish migration. 65 Fed. Reg. 49,089 col. 2.

Public Power believes that, in certain circumstances, restoration and mitigation measures may provide benefit. For example, measures such as wetlands restoration or creation and other types of habitat improvement, removal of barriers to fish migration, creation of artificial reefs, and installation of fish ladders or creation of fish hatcheries may provide alternatives to technology based requirements. Public Power believes that such measures could be included in the site-specific review and permitting process on a voluntary basis. In that vein, the permitting agency could be authorized to consider any proposed environmental enhancement that offers a reasonable means of providing material benefits to important species.

Public Power does not, however, believe that EPA has authority to mandate the inclusion of mitigation measures as part of § 316(b). Environmental enhancements are not “intake structure technologies” and should not be included as such. Public Power may find that providing flexibility in the consideration of site-specific issues will make such mitigation measures an attractive alternative for some facilities and would recommend that, as such, they should be preserved as an option or alternative for the source and local regulators. However, Public Power would oppose any requirement that such measure be made a part of the permitting requirements.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.043.029

Subject Matter Code	20.2
Monitoring Requirements	

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Public Power does not believe that section 316(b) provides authority for post-permitting monitoring by the facility. EPA has not stated its objectives or reasons for monitoring. To the extent that such is being proposed to regulate water quality and establish TMDLs, this is not warranted under the statute. Such requirements to not further the objectives of section 316(b) and may indeed be beyond the scope of the statute. Moreover, EPA has not adequately considered the burden on the facility in proposing such a requirement. Any such monitoring will significantly increase the annual costs associated with the CWIS and, as such, this economic burden on the source must be considered in the rulemaking.

However, to the extent that any monitoring is required, EPA should specify the type and form of monitoring. For example monitoring requirements under the Acid Rain Program are very specific and clearly identified. In addition, any monitoring requirements should be coordinated with existing state and local requirements. In many instances, generating facilities are already obligated to conduct monitoring for water quality standards or endangered species concerns. Such requirements should be coordinated so as to minimize the economic burden on facilities.

EPA Response

EPA believes Section 308 and Section 316(b) of the Clean Water provide ample authority for the monitoring provisions of today's rule. At § 125.87, today's final rule requires biological monitoring and visual or remote inspections at all facilities. Track I facilities and Track II facilities that rely on specified velocity levels as part of their alternative technology(ies) are also required to monitor screen head loss and velocity. EPA has considered the costs of such monitoring in the ICR, and does not consider the requirements to be burdensome or expensive.

Both Track I and Track II facilities must conduct biological monitoring for impingement and entrainment to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. In order to prevent extensive and open-ended biological monitoring (which can be burdensome and expensive), today's rule adds that after 2 years the Director may approve an applicant's request for less frequent monitoring. Objectives for post-permit monitoring are to provide supporting data to assure that the technologies are consistently performing as projected under all operating and environmental conditions.

Specific monitoring requirements include:

Impingement Sampling. You must collect samples to monitor impingement rates (simple enumeration) for each species over a 24-hour period and no less than once per month when the cooling water intake structure is in operation.

Entrainment Sampling. You must collect samples to monitor entrainment rates (simple enumeration) for each species over a 24-hour period and no less than biweekly during the primary period of reproduction, larval recruitment, and peak abundance identified during the

Source Water Baseline Biological Characterization required by 40 CFR 122.21(r)(3) or the Comprehensive Demonstration Study required in § 125.86(c)(2). You must collect samples only when the cooling water intake structure is in operation.

Velocity Monitoring. If your facility uses intake screen systems, you must monitor head loss across the screens and correlate the measured value with the design intake velocity. The head loss across the intake screen must be measured at the minimum ambient source water surface elevation (best professional judgment based on available hydrological data). The maximum head loss across the screen for each cooling water intake structure must be used to determine compliance with the velocity requirement in § 125.84(b)(2). If your facility uses devices other than intake screens, you must monitor velocity at the point of entry through the device. You must monitor head loss or velocity during initial facility startup, and thereafter, at the frequency specified in your NPDES permit, but no less than once per quarter.

Visual or Remote Inspections. You must either conduct visual inspections or employ remote monitoring devices during the period the cooling water intake structure is in operation. You must conduct visual inspections at least weekly to ensure that any design and construction technologies required in § 125.84(b)(4) and other technologies to minimize entrainment and maximize impingement survival are maintained and operated to ensure that they will continue to function as designed. Alternatively, you must inspect via remote monitoring devices to ensure that the impingement and entrainment technologies are functioning as designed.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

J.W. White for Pamela F. Faggert

On Behalf Of:

Dominion

Author ID Number:

316bNFR.044

Note

Fully supports the comments made by UWAG (316bNFR.068) and EEI (316bNFR.069)

Comment ID 316bNFR.044.001

Author Name J.W. White for Pamela F. Faggert

Organization Dominion

Subject Matter Code 10.01

Regulatory Framework Options

Dominion does not agree with EPA's proposed use of a categorical one-size-fits-all technological approach, based on location of the intake structure, volume of water withdrawn, and intake velocity. Categorical rules (location, volume of water withdrawn, intake velocity) do not account for the many variables that affect impingement, entrainment, and environmental impact.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. See response to comment 316bNFR.006.005.

Comment ID 316bNFR.044.002

Author Name J.W. White for Pamela F. Faggert

Organization Dominion

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Underlying these proposed categorical rules is a simplifying assumption that entrainable eggs and larvae and impingeable fish are concentrated in certain areas (estuaries and the "littoral zone") and that they are uniformly distributed through the water column.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.044.003

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Organization Dominion

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

The § 316(b) statute calls for a three-step analysis and decision-making process. Dominion urges EPA to employ this process in the rule by requiring permit applicants and regulatory agencies to:

Determine whether a proposed or existing cooling water intake structure will respectively pose or does cause an "adverse environmental impact."

If so, list any technologically feasible choices for location, design, construction, or capacity of that particular intake structure that is known to or can be shown to minimize the "adverse environmental impact."

Decide which is the right choice based on effectiveness and cost.

EPA Response

EPA does not agree that section 316(b) calls for a three-step analysis. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. It provides that any standard established pursuant to section 301 or 306 of the CWA and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact. See 316bNFR.068.007; 316bNFR.068.008 and 316bNFR.206.014.

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. The technologies upon which the performance requirements in the rule are based are available and economically practicable, and have been determined by EPA to constitute BTA for new facilities.

Comment ID 316bNFR.044.004

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Organization Dominion

Subject Matter Code 9.44

Request for Comment: Definition of AEI

Section 316(b) cannot be implemented unless there is a definition of “adverse environmental impact.” “Adverse environmental impact” cannot mean harm to a single fish or a single egg; it must mean harm at the population or community level. Dominion supports UWAG's recommended definition of “adverse environmental impact”: Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population’s ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function and (2) is attributable to the operation of the cooling water intake structure. The statute calls for minimizing “environmental impact,” not eliminating entrainment and impingement mortality, so technologies should be evaluated accordingly. Fisheries should be viewed as a resource that can be managed and sustained. EPA should recognize that some losses of individual fish are not harmful to the fishery resource as a whole and that there is no reason to view losses caused by cooling water intake structures as fundamentally different from losses caused by any other human activity or natural occurrence.

EPA Response

Please see response to comment 316bNFR.069.008 and section VI.B of the preamble to today's rule.

Comment ID 316bNFR.044.005

Author Name J.W. White for Pamela F. Faggert

Organization Dominion

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Dominion urges EPA to consider costs in deciding what intake structure technology is the "best available." The technology that the rule embodies, i.e., cooling towers, has environmental costs (e.g., aesthetics, drift) that EPA has not yet explored for the administrative record. Section 316(b) authorizes EPA only to regulate cooling water intake structures, not entire cooling systems. A site-specific approach is likely to be more cost effective because in many cases existing data would be available. The costs, performance and benefits of any given technology vary widely from site to site and after a thorough examination of all relevant site-specific factors, applicants and regulatory agencies together could select the technology that optimizes the net benefits for a particular site.

EPA Response

Regarding the role of cost in deciding what technology constitutes best technology available for minimizing impingement and entrainment see response to comment #316bNFR.206.014.

Regarding potential environmental costs of cooling towers see response to comment #316bNFR.068.100.

Regarding EPA's legal authority to regulate cooling water intake capacity see response to comment #316bNFR.069.021.

Regarding the balancing of site-specific factors and optimization of benefits see response to comment #316bNFR.068.138.

Comment ID 316bNFR.044.006

Author Name J.W. White for Pamela F. Faggert

Organization Dominion

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

In addition to the site-specific decision-making approach described above, Dominion also favors an option to minimize and enhance regulatory review and to provide the regulated community with an additional compliance alternative. This option would identify technological adaptations to cooling water intake structures that if installed or implemented would satisfactorily meet the acceptance thresholds of §316(b). Specifically, the applicant could opt to install a pre-approved technology or alter its operations in a manner that has been determined a priori to protect target populations or communities. By installing, maintaining, and operating approved equipment or properly changing operating practices under this approved-technology rule, the cooling water intake structure is thereby deemed in compliance with §316(b). This option provides expedient and certain compliance alternatives, which in today's competitive landscape, is highly desirable. This option can also provide non-regulated stakeholders with a degree of confidence that the cooling water intake structure complies with the proposed rule and that the public waters are not subjected to "adverse environmental impact." In addition to preserving the flexibility to consider site-specific features, this type of categorical rule should remain in the proposed regulation as an alternative. It is entirely appropriate for EPA to recognize that certain technological adaptations to cooling water intake structures acceptably minimize or avoid "adverse environmental impact" and, if adopted at the outset, can expedite a difficult regulatory process, minimize mutual resources, and provide the comfort of compliance for all stakeholders.

EPA Response

See the preamble to the final rule. The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

Comment ID 316bNFR.044.007

Author Name J.W. White for Pamela F. Faggert

Organization Dominion

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

Dominion suggests a screening approach, using readily available design and site specific information, could be used to quickly identify sites and cooling water intake structure designs that present no appreciable risk of adverse environmental impact.

EPA Response

See response to 316bNFR.014.029.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Gary R. Aydell

On Behalf Of:

Louisiana Dept. of Environmental Quality

Author ID Number:

316bNFR.045

Comment ID 316bNFR.045.001

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

EPA does not need to promulgate guidelines for water intake structures. Facilities building intake structures which are located in waters of the US are required to obtain permits from the Corps of Engineers (COE) - either under Section 404 of the Clean Water Act (CWA) or Section 10 of the Rivers and Harbors Act. On a case-by-case basis the COE may prepare a environmental impact statements for these projects. It is a waste of federal and state resources for two agencies to regulate the same activity.

EPA Response

In Section 316(b), Congress directed in that "[a]ny standard established pursuant to Section 1311 of this title or Section 1316 of this title and applicable to a point source shall require that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." Section 316(b) is the only provision of the Clean Water Act that specifically addresses the intake of water. Its commands are supplemental to those of Section 404, Section 10, and NEPA.

Comment ID 316bNFR.045.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

As proposed the requirements on intake structures will encourage facilities to use ground water rather than surface water for cooling purposes. Whenever adequate surface water is available, it would be better to use surface water and reserve ground water for potable water usage.

EPA Response

EPA disagrees that the final rule encourages facilities to use ground water. Although, an analysis of new combined-cycle facilities identified a trend toward less use of surface cooling water, EPA believes this reflects the increased competition for water, an heightened awareness of the need for water conservation, and increased local opposition to the use of surface water for power generation. The analysis showed that 66 percent of the analyzed facilities use alternative sources of cooling water (e.g., gray water, ground water, municipal water, or dry cooling). Additionally, under Track II, an applicant has the opportunity to conduct site-specific studies to demonstrate that alternative technologies or configurations will result in a reduction of impingement and entrainment to a level comparable to the level achieve at the cooling water intake structure under Track I at a lower cost.

Comment ID 316bNFR.045.003

Subject Matter Code	12.1
	Freshwater Streams/Rivers

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

There should be some correlation between the criteria for the intake structures and the size of the rivers. The Mississippi River has a 7Q10 flow rate of 141,955 cfs or 9.2 X 10^10 GPD and a harmonic mean flow rate of 366,748 cfs or 2.4 X 10^11 GPD. One of the larger cooling water intakes on the Mississippi River uses 1040 MGD. The 1040 MGD represents 1% of the Mississippi River's 7Q10 flow rate and 0.4% of the harmonic mean flow rate of the Mississippi River. On page 49068 of the August 10, 2000 Federal Register EPA discusses the withdrawal of more than 1% of the mean annual flow of a freshwater river or stream. As previously mentioned, one of the largest users of surface water on the Mississippi River withdraws only 1 % of the river's critical low flow. On the other hand, 2 MGD is more than the critical flow of some of the rivers in Louisiana. Therefore, it would be inappropriate to apply the same requirements for all size rivers.

EPA Response

EPA has opted not to include the 25% 7Q10 standard in today's final rule.

EPA believes the commenter has confused the proposed applicability threshold (2 MGD) with limitations on the design intake capacity for riverine facilities (5% Mean Annual Flow). The 2 MGD cited by the commenter refers to EPA's proposal to subject facilities with a design intake capacity of 2 MGD (among other criteria) to final regulations for New Dischargers. A facility would not be allowed to withdraw 2 MGD if it represented more than 5% of the instream mean annual flow for the source waterbody. (see section I.C, "What Cooling Water Use and Design Intake Flow Thresholds Result in a New Facility Being Subject to This Final Rule?").

With today's final rule, EPA is establishes a national standard for cooling water withdrawals from freshwater streams and rivers. This will require facilities to design their cooling water systems in such a fashion as to withdraw no more than 5% of a river's mean annual flow. EPA's intent is minimize adverse environmental impact in the source waterbody regardless of its size or total volume of water withdrawn from it. EPA believes today's final rule accomplishes this goal.

Comment ID 316bNFR.045.004

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

Subject Matter Code 13.1

Requirement of 0.5 fps

We question the selection of 0.5 ft/sec as the maximum velocity allowed in most intake structures. At a flow rate of 200,000 cfs in the Mississippi River, it takes the following times for a spill to travel from mile 260 to mile 99.1: leading edge 114 hrs, peak 125 hrs and trailing edge 150 hrs. These travel times calculate into velocities of 2.07 ft/sec, 1.89 ft/sec and 1.57 ft/sec. State of Louisiana, Department of Transportation and Development, Office of Public Works, Water Resources Technical Report No. 17, Time of Travel of Solutes in Louisiana Streams indicates that many rivers in Louisiana have velocities in excess of 0.5 ft/sec. We do not understand the logic or science which results in the need of the maximum velocity in an intake structure to be 0.5 ft/sec if the organisms already experience velocities greater than this in rivers. Furthermore, the support and anchorage of structures in the Mississippi River is already a challenge with the existing current. By increasing the size of intake structures to achieve the maximum intake velocities of 0.5 ft/sec, the problems with support and anchorage of these structures will increase.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

The anchorage of intake structures is not likely to be a substantial problem for new facilities. A facility that has yet to be constructed can integrate into its design an intake velocity of 0.5 ft/s and minimize the impacts to the construction and operation of the intake and the facility.

Comment ID 316bNFR.045.005

Subject Matter Code MISC

Miscellaneous Comment

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

Zebra muscles have become a significant problem along the Mississippi River in Louisiana and it is expected to spread to other waterbodies in the state. It has been reported that one method to combat the accumulation of zebra muscles is to maintain a velocity in piping and intake structures of 15-17 ft/sec. If these velocities aren't maintained and zebra muscles accumulate inside intake structures and piping, additional chemicals will be needed to combat the accumulation of zebra muscles.

EPA Response

EPA recognizes that maintaining sufficiently high intake velocities is one possible solution for minimizing settlement by biofouling organisms such as zebra mussels. However, further research by the Agency suggests that this is not the most effective technique. Often, intake velocities are designed to be as low as possible to reduce the impingement and entrainment of aquatic organisms. Additionally, the intake systems of many facilities are unprepared to support such high intake velocities and would possibly require modifications in order to maintain such velocities. An analysis of facility survey data at existing facilities suggested that only 33 (3.4 percent) of 978 surveyed facilities have intake velocities of sufficient magnitude (greater than 5 ft/s) to inhibit biofouling. Fortunately, a variety of viable alternative technologies and management strategies for dealing with biofouling are available. Examples of these options include the use of construction materials that inhibit attachment of organisms, mechanical cleaning, and chemical and/or heat treatments. While no one strategy has been shown to be universally applicable, there are certainly affordable and implementable options. Maintaining a high intake velocity has not been shown to be the most effective way to control biofouling, since other methods have been shown to be more effective at a lower cost, especially in the context of new facilities. A facility that has yet to be constructed can integrate biofouling control technologies into its design and minimize the impacts of biofouling on normal operations.

Comment ID 316bNFR.045.006

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

Page 49066 of the August 10, 2000 Federal Register states, "The cooling water intake structure extends from the point at which water is withdrawn from the surface water source to the first intake pump or series of pumps." It is our understanding that most intake pumps are submersible pumps located in the source water. Thus, the entrance of the intake structure and the inlet to the pump are close together. If the 0.5 ft/sec max. velocity criteria is maintained, it is hard to envision how the structure will funnel down (decrease in size) from the intake structure to the pump.

EPA Response

In the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the intake pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed.

Track I of the final rule maintains the proposed design intake velocity requirement of 0.5 ft/s. This requirement is a through-screen design intake requirement and should be determined at the point where the water passes through the open area of the intake screen or other device against which organisms might be impinged. See 125.83. The design intake velocity does not need to be maintained after that point. However, the point of compliance can vary with the design of the intake. New facilities with intakes that are not completely submerged must monitor head loss.

Comment ID 316bNFR.045.007

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

On page 49119 of the August 10, 2000 Federal Register under "(a) Source water baseline biological characterization." the proposed regulations discuss baseline biological characterization data at least 1 year before submittal of the application. If the regulations are to apply to all new facilities which begin construction after promulgation, how will some new facilities have time to collect 1 year of baseline data?

EPA Response

See Response to Comment 316bNFR.536.014.

Comment ID 316bNFR.045.008

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

Subject Matter Code 23.3

State Burden and Costs for Permitting Activities

Throughout the proposed regulations, reference in made to baseline data, sampling plans, etc. being submitted to the Director for approval. The states and EPA already have a backlog of major and minor permits to issue or re-issue. Where will the states and/or EPA get the resources to review all the submittals required by these new regulations?

EPA Response

EPA does not anticipate that the final rule will substantially increase the burden on permitting authorities; if anything, it will have the opposite effect. See response to comments 316bNFR.027.051.

Comment ID 316bNFR.045.009

Subject Matter Code 20.2

Monitoring Requirements

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality

Page 49121 of the August 10, 2000 Federal Register discusses monitoring. The proposed regulations specify collection of samples to monitor impingement rates for each species over a 24-hour period no less than once per month, collection of samples to monitor entrainment rates for each species over a 24-hour period no less than biweekly, and visual inspections at least weekly for entrainment and impingement. How are facilities suppose to conduct this monitoring? Will there be removable screens to monitor for impingement rates and inspect visually? Or, will facilities have to send divers to conduct this monitoring and inspections?

EPA Response

The mechanics of sampling will vary depending on the specific design of a particular facility. For example, some facilities may have fish collection devices (e.g. fish baskets) as an integral component of their design. At facilities lacking such components, sample collection logistics (e.g. sampling device retrofit) will be the responsibility of the monitoring team.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Anne H. Hicks

On Behalf Of:

G. Graham Holden, PC O-B-O
Oglethorpe Power Corp.

Author ID Number:

316bNFR.046

Comment ID 316bNFR.046.001

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Regulated Facilities

Oglethorpe Power agrees that a two MGD intake flow is a reasonable threshold for rule applicability.<FN 3>

Footnotes

3 See, e.g., 65 Fed. Reg. 49066.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.046.002

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

If a facility receives cooling water from another facility (e.g. a POTW), instead of from one of the locations listed in proposed § 125.84, EPA's proposal will not apply. Oglethorpe Power is presently performing siting studies for new generating units. One of the potential sources of water being evaluated is reclaimed water (effluent from sewage treatment plants). Because this water has already been withdrawn by another entity, and will continue to be withdrawn, whether the effluent is reused or not, its use should not be subject to 316(b). The Company asks that EPA respond if it disagrees with such interpretation on the scope and applicability of these proposed rules.

EPA Response

The comment does not contain enough information for EPA to determine whether or not today's rule applies to the situation described.

Comment ID 316bNFR.046.003

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Adverse Environmental Impact

In this proposed rule, EPA discusses various alternatives for either defining adverse environmental impact associated with the operation of cooling water intake structures or establishing a threshold for the level of impact deemed to be adverse. <FN 4> Oglethorpe Power favors an approach similar to EPA's fourth alternative, which would define adverse environmental impact in relation to site-specific conditions. Adverse environmental impact should be assessed on a case-by-case basis, with comprehensive studies of the pertinent biological and ecological factors of the particular U.S. water and species impacted by the specific facility.

Footnotes

4 See 65 Fed. Reg. 49074-49075.

EPA Response

Please see response to comment 316bNFR.014.013 and section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.046.004

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Zero-Intake Flow

EPA states that it is considering an alternative based in whole or in part on a zero-intake flow requirement, commensurate with levels achievable through the use of dry cooling systems.<FN 5> Dry cooling systems are inefficient, expensive and are not practical in Georgia's hot climate. It would be extremely burdensome for Oglethorpe Power to bear the cost of such systems, and be forced to pass on such expenses to its Member Systems and to their members (the ultimate consumers). The Company strongly opposes a zero or near zero intake-flow requirement that would effectively require the use of dry cooling technology. If there is no intake, then section 316(b) does not apply.

Footnotes

5 See 65 Fed. Reg. 49080-81.

EPA Response

EPA has not adopted dry cooling based requirements for the final rule for some of the reasons described by the commenter, such as climactic inefficiencies and economic practicability. See Section V.C of the preamble to the final rule for a full discussion of the reasons that EPA rejected dry cooling.

The final sentence of the comment is without context. EPA understands that new power plants that install dry cooling technologies will not be subject to the 316(b) rule. However, that would not preclude EPA from adopting standards for 316(b) based on dry cooling, as EPA has the authority to regulate cooling water intake capacity and, hence, may require zero or near-zero intake alternatives.

Comment ID 316bNFR.046.005

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 10.12

Request for Comment: Best Technology Available Requirement "Trading"

Trading

EPA invites comments on all aspects of an approach that would allow trading of BTA components to achieve equivalent reductions in adverse environmental impact at a lower cost. <FN 6> However, Oglethorpe Power does not believe that in-facility trading works, unless the facility has a site-specific reason that would justify the trade. For example, reduced intake velocity may reduce impingement, but allowing increased flow increases entrainment. Without site-specific studies, the facility cannot assess the relative importance.

Footnotes

6 See 65 Fed. Reg. 49082, para. 1.

EPA Response

See response to 316bNFR.008.009.

Comment ID 316bNFR.046.006

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Location

With regard to BTA requirements with respect to intake location, Oglethorpe Power favors EPA's proposed more stringent requirements for more ecologically sensitive areas (estuaries and littoral zones), and conversely less stringent requirements for less ecologically sensitive areas, over the other alternatives discussed.<FN 7> This approach allows applicants to avoid expensive, full-blown studies in areas where the ecological sensitivity does not warrant them.

Footnotes

7 See 65 Fed. Reg. 49083-84.

EPA Response

EPA agrees that location is an important factor in addressing cooling water intake structure impacts. However, after reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.046.007

Subject Matter Code	12.4
Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility	

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Flow and Volume

EPA's proposed requirement for flow rates equivalent to closed cycle cooling in estuaries<FN 8> defeats the whole purpose of a section 316 demonstration. If a facility operator can demonstrate that no significant impact occurs from an installation, that installation should be permitted.

Footnotes

8 See 65 Fed. Reg. 49087.

EPA Response

Please see responses to comments 316bNFR.508.017 (rejection of sensitive waterbody approach) and 316bNFR.014.013 (two-track framework).

Comment ID 316bNFR.046.008

Subject Matter Code	13.1
Requirement of 0.5 fps	

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Velocity

As EPA confirms, a velocity of 0.5 feet per second has been used as state and federal guidance for years.<FN 9> However, this figure is based on a particular fish species. EPA should develop species-specific standards for applicants to use in site-specific studies.

Footnotes

9 See 65 Fed. Reg. 49087.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

These data were compiled from over 120 species and represent a broad cross section of fish species, each with different swimming abilities. These data provide a comprehensive basis for the velocity requirement, as a given facility is more likely to be co-located with multiple species, as opposed to limiting the velocity requirements to a single species in a species-specific approach. However, EPA notes that if the permit applicant does not want to meet the specific Track I velocity requirement, the applicant can, under Track II, conduct site-specific studies and seek to demonstrate equivalent protection from impingement and entrainment.

Comment ID 316bNFR.046.009

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 16.5

Request for Comment: Use of Innovative Technologies

Additional BTA Technologies

Oglethorpe Power commends EPA for its support of innovative technologies to be evaluated on a site-speciific basis. This flexibility promotes future development of better technologies

EPA Response

See response to comment 316bNFR.071.019

Comment ID 316bNFR.046.010

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Restoration Measures

EPA's concept of restoration measures, in the context of section 316(b), is generally unworkable.<FN 10> The only quantifiable restoration method would be offsetting, where an applicant will stop use of an older intake facility that does more harm than the proposed one.

Footnotes

10 See 65 Fed. Reg. 49089-90.

EPA Response

See preamble section V.B.2.f of today's rule for a discussion on the different ways a new facility may show that it will attain a performance comparable to that achieved in Track I. See 316bNFR.008.012 regarding offsetting.

Comment ID 316bNFR.046.011

Subject Matter Code	21.0
	Cost/Benefit Analysis

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Cost Considerations

Oglethorpe Power believes that EPA has grossly underestimated the costs associated with the implementation of these proposed rules.<FN 11> EPA should seek to develop better cost estimates, before it attempts to use the costs set forth in this rulemaking as justification for the rule itself.

Footnotes

11 Refer to comments in § VII below on EPA's Economic and Engineering Analysis document.

EPA Response

EPA disagrees with the commenter's argument that the analysis grossly underestimates costs associated with the implementation of the rule. Since proposal EPA has made a number of revisions to the costing analysis including increasing the number of proposed new facilities that are subject to the rule and re-estimating unit costs based on additional more detailed information. EPA believes that these amendments to the cost analysis allow for a more robust and representative basis for estimating costs. For additional information regarding the cost analysis including a discussion of the revised unit cost estimates please see Chapter 6: Facility Compliance Costs of the Economic Analysis.

Comment ID 316bNFR.046.012

Subject Matter Code 125.85

Alternative Requirements

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Comment on § 125.85(a)

The proposed approach to allow limited additional or alternative requirements based on site-specific needs seems reasonable, especially with respect to evaluating alternative technologies. However, sub-section (2) establishes a criterion for EPA's decision of whether to grant a request for an alternate requirement that is less stringent than the requirements in § 125.84(a)-(e). The criterion that compliance with the particular requirement must result in compliance costs "wholly out of proportion to the costs EPA considered in establishing the requirement at issue" appears unfair and based on unknown costs. Oglethorpe Power proposes a more sound alternative that would not allow the costs to be "disproportionate to any environmental benefits to be gained, based on site-specific data."

EPA Response

See response to comment 316bNFR.068.125 and comment 316bNFR.027.020.

Comment ID 316bNFR.046.013

Subject Matter Code	24.3
	EEA - Plant Construction Costs

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Definition of Gas Combustion Turbine

There may be an error on page 3-2, which defines Gas Combustion Turbine as units which burn a "combination of natural gas and distillate oil..." It appears incorrect to include a unit burning oil within the definition of a Gas Turbine. Possibly, the term defined should be “Combustion Turbine.”

EPA Response

The definition for Gas Combustion Turbine presented on page 3-2 was established by the U.S. Department of Energy. EPA will therefore continue to use this definition in Chapter 3: Profile of the Electric Power Industry. For a further discussion of this type of turbine, as well as other common generating technologies, please see the DOE’s Electric Power Industry Overview, http://www.eia.doe.gov/cneaf/electricity/page/prim2/chapter2.html#utilities.

Comment ID 316bNFR.046.014

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 24.3

EEA - Plant Construction Costs

Table 3-2

As a technical correction, Table 3-2 on page 3-8 does not include hydro as a renewable.

EPA Response

EPA agrees with the commenter that hydroelectric power is a renewable energy source. However, EPA has chosen to present it separately from the rest of the renewable resources due to the quantity of hydroelectric power generated. As shown in Table 3-2, in 1998 hydro-power accounted for more than four times the quantity of net generation compared to the remaining renewable resources combined.

Comment ID 316bNFR.046.015

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 24.3

EEA - Plant Construction Costs

Electricity Prices

On page 3-28, EPA assumes electricity prices will come down due to deregulation. Recent experience (e.g., electricity in California and natural gas in Georgia) indicates the opposite to be true, at least in the short term.

EPA Response

The information presented on page 3-28 of the electricity profile is summary information from EIA's Annual Energy Outlook 2000. A similar decrease in electricity prices is projected in the AEO2001. EPA recognizes the recent volatility in energy prices. While there is no guarantee that EIA's long-term forecast is correct, this is the most recent long-term information available from the Department of Energy, and therefore it is reasonable to use this information in the analysis.

Comment ID 316bNFR.046.016

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 24.2

EEA - Estimation of Unit Costs

Table 6-1

On page 6-3, EPA assumes that the length of intake pipe does not affect the cost. Actually, intake pipe for power plants can be quite large, such that its cost can easily exceed the $100,000 cost approximation that EPA estimated for extending intake pipe. As such, it appears that these costs have been substantially underestimated.

EPA Response

The final rule no longer contains requirements for location within a waterbody. Therefore, extension of an intake pipe is not a component of the costs of Track I. (It might be part of Track II - but we are reasonably assuming that Track 2 would be pursued only if less costly than Track I.)

EPA disagrees with the commenter's assertion concerning the $100,000 average cost for extending pipe. The cost of extending pipe may vary depending on the length of pipe extended and the method used to extend the pipe as is discussed in table 6-3 of the proposal EEA. In EPA's view, the estimate of $100,000 for extending pipe is inappropriate for national cost estimates.

Comment ID 316bNFR.046.017

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 24.2

EEA - Estimation of Unit Costs

Section 6.5

On page 6-24, EPA does not include the costs of "reduced energy efficiencies" due to switching from once-through to closed cycle cooling. These costs, especially replacement power costs and extra fuel costs, will likely be larger than all the other costs EPA examined.

EPA Response

EPA has revised the economic and engineering analyses substantially to include the costs of energy penalties of cooing towers. See the Technical Development Document, response to comment 316bNFR.068.332, and the Economic Analysis.

Comment ID 316bNFR.046.018

Author Name	Anne H. Hicks
Organization	G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Subject Matter Code 24.2

EEA - Estimation of Unit Costs

Table A-1

On page AppA-5, EPA based cooling tower costs on flow rate and temperature "delta." Actually, cold water approach to wet bulb is an important cost factor, but is not called "delta" - it is called "approach." Delta is the condenser rise. The same mistake is made on page AppA-13.

EPA Response

EPA notes the comment and has made the correction. See Chapter 2 of the Technical Development Document.

Comment ID 316bNFR.046.019

Subject Matter Code	24.2
	EEA - Estimation of Unit Costs

Author Name Anne H. Hicks

Organization G. Graham Holden, PC O-B-O Oglethorpe Power Corp.

Section B.I.a Costs

On page AppA-11, EPA says underwater pipelines range from 3"- 48" in internal diameter. This is much smaller than electric power installations, where 6 - 10 foot diameters are more typical.

EPA Response

The final rule contains no provisions for location of intakes away from shorelines. EPA no longer requires certain facilities in certain locations to relocate their intake by constructing underwater piping. Therefore, the costs disputed herein are not part of the final cost estimates Track I of this rule.

EPA disagrees that pipe diameters for the vast majority of recently constructed power plants approach the size suggested by the commenter. It is possible that some extremely large pipe sizes may be used at extremely large flow once-through facilities. However, the vast majority of planned new power plants (90 percent) will incorporate flow reduction techniques. Therefore, the size of underwater intake pipes (where applicable) would be much smaller than those used at once-through facilities. EPA's research and record demonstrate that underwater pipes for the vast majority of projected new facilities will correspond to the sizes estimated in EPA's proposal.

we believe that EPA's costs are understated and should be revised before further use. Furthermore, alternative technologies should be evaluated, based on cost of implementation and effectiveness. Finally, Oglethorpe Power urges EPA to focus on site-specific conditions and needs when evaluating compliance with section 316(b).

EPA Response

EPA received many good comments regarding the cost estimations presented in the proposed rule. Section VI. H of today's rule addresses specific comments raised regarding EPA's consideration of facility level costs. EPA's revised Economic Analysis adjusts the total estimated annualized compliance costs of today's final rule to $47 million. Further discussion on the Economic Analysis is presented in Section VIII of the final rule.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. With this approach facilities will be able to evaluate technologies to determine the most appropriate technology on a site-specific basis based on cost and effectiveness analyses.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jacqueline Savitz

On Behalf Of:

Coast Alliance, American Oceans Campaign, Assateague Coastal Trust, Columbia River Deepening Opposition Group, Cape Arago Audubon Society, Northwest Environmental Advocates, Pacific Coast Federation of Fisherman's Associations, Sierra Club-Eastern Shore G

Author ID Number:

316bNFR.047

Comment ID 316bNFR.047.001

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Jacqueline Savitz

Organization Coast Alliance, American Oceans Campaign, Assateague Coastal Trust, Columbia River Deepening Opposition Group, Cape Arago Audubon Society, Northwest Environmental Advocates, Pacific Coast Federation of Fisherman's Associations, Sierra Club-Eastern Shore G

Cooling technology has advanced considerably over the past three decades, and this regulation should promote the use of the Best Technology Available. As you know, dry cooling and closed-cycle cooling reduce capacity needed by orders of magnitude, thus reduce the impacts on aquatic life. Yet even for new facilities, EPA fails to require this technology anywhere in the country. This means that our estuaries and littoral zones will only benefit from sub-optimal wet cooling technologies,at best.

Once-through cooling, which will be the path of least resistance for most facilities, and which would be allowed by this rule in most of the waters of the United States, creates significant impingement and entrainment problems for aquatic life. The proposed regulations allow this approach since they fail to include cooling water capacity restrictions for oceans, lakes and rivers beyond the littoral zone.

EPA Response

EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA. See Section V.C of the preamble to the final rule for a discussion of the reasons that EPA rejected dry cooling as best technology available for minimizing adverse environmental impact.

EPA notes that the littoral zone requirements of the proposal are not a part of the final rule. Additionally, EPA does not distinguish between water bodies in terms of the requirements of this rule. Instead, EPA has based the final rule on the environmental performance of closed-cycle cooling, measured in terms of reducing impingement and entrainment. Thus the fast track permitting facilities will be required to reduce capacity equivalent to the capacity of a closed-cycle system. Under Track II, there may be situations where once-through cooling may be implemented, but these situations are considered to be few and only to be permissible where impingement and entrainment is reduced to the same level as would occur under Track I. In fact, EPA estimates that of the nine new power plants and 29 new manufacturers that would utilize once-through cooling in absence of this rule, each will incur the costs of installing closed-cycle recirculating cooling systems (note: for manufacturers, this may be accomplished through recycling and reuse of cooling water within the plant). Therefore, the final rule will guarantee that impingement and entrainment reductions are achieved at a level commensurate with closed-cycle cooling.

Comment ID 316bNFR.047.002

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Subject Matter Code 10.0

Best Technology Available

New plants and intake structures should take advantage of and incorporate the best available technology and science available in an effort to minimize environmental impacts. 316 (b) mandates use of the best technology available in "location, design, construction, and capacity", so any new rule must reflect that mandate. To allow broad waivers to this provision would violate existing law.

EPA Response

EPA agrees with the commenter that new facilities should take advantage of and incorporate the best available technology and science available in an effort to minimize environmental impacts. In the final rule, EPA is establishing a two-track technology-based approach for new facilities that establishes best technology available via location, design, construction, and capacity requirements while allowing facilities to install most appropriate, site-specific BTA. Broad waivers from the requirement to minimize impingement and entrainment impacts will not be allowed.

However, as allowed in Section 125.85 a State Director may establish alternative technology requirements if the applicant proves that the requirements of the rule would result in compliance costs wholly out of proportion to the costs EPA considered in the setting the requirements. The alternative technology must be no less stringent than justified by the wholly out of proportion cost. See 316(b)NFR 206.032 for a discussion of EPA's authority to authorize this type of variance in CWA section 316(b) for new facilities.

Comment ID 316bNFR.047.003

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Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

A cost/benefit analysis must include all costs, both environmental and economic. In making decisions based on overall cost of a project, environmental costs such as habitat loss, fisheries stock depletion, and the associated revenue loss must be included. For far too long these costs were considered externalities and not factored into the decision-making process. To only look at direct costs, such as construction and operation, is short-sighted.

EPA Response

EPA appreciates the commenter's remarks on the valuation of environmental and economic costs and benefits. As noted in Chapter 11 of the EEA, "EPA was unable to conduct a detailed, quantified analysis of the proposed rule because much of the information needed to quantify and value potential reduction in impingement and entrainment at new facilities was unavailable," (EEA, p. 11-1). The chapter then proceeds to detail the types of information that would be required to do a comprehensive benefits analysis. Also please see response to comment 316bNFR.068.100, the economic analysis, and the TDD.

Comment ID 316bNFR.047.004

Subject Matter Code MISC

Miscellaneous Comment

Author Name Jacqueline Savitz

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These national standards should act as a minimum, but the individual characteristics of each water body must also be considered for each intake structure. In addition, standards should be set with an eye towards getting additional input from the local scientific community. Local scientists know a particular area better than most regulators, so their insights need to take these thoughts into account. For example, salmon spawning and runs should play a large role in determining the seasonal operations in the Pacific Northwest.

EPA Response

The final rule recognizes that a State may, under sections 401 or 510 of the CWA, ensure the inclusion of any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure at a new facility that are necessary to ensure attainment of water quality standards, including designated uses, criteria, and antidegradation requirements. In addition, the final rule requires the facility to select and implement design and construction technologies or operational measures for minimizing impingement mortality or entrainment of all life stages of fish and shellfish if certain conditions exists. One such condition is to require additional design and construction technologies if the permit director or any fishery management agency(ies) determine that even after the facility meets the capacity, velocity, and proportional flow requirements the facility would still contribute an undesirable stress to any life stages of fish or shellfish.

Comment ID 316bNFR.047.005

Author Name	Jacqueline Savitz
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Subject Matter Code 15.1

Request for Comment: Role of Restoration

The Clean Water Act calls only for BTA, not restoration. Arguably, restoration can improve an ecosystem above those protections offered by BTA, but prevention of loss to a community or habitat is much more effective than restoration. As such, restoration needs to be an additional consideration, not a primary component in the planning process of an intake structure project.

EPA Response

See preamble sections V.B.2.f and VI.L for discussions on the basis and role of restoration in today's final rule. EPA believes that restoration can be considered a design technology where it accomplishes comparable performance to other requirements established as BTA for minimizing adverse environmental impact.

Comment ID 316bNFR.047.006

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Subject Matter Code 10.03

Additional Littoral Zone Requirements

We ask the administration to broaden the littoral zone definition to provide maximal protection for ecosystems. For example, the littoral zone definition needs to remove the "euphotic" consideration. The entire water column is critical in the life of a water body. To assume that only the area down to the 1% light level is worthy of consideration is short-sighted and will invariably lead to future impacts on the intake water body. For example, many larvae migrate to the darker portions of the water column as a survival mechanism to escape predators; in this situation, allowing intake from this lower portion of the water column would result in an overall decline in the estuary due to high larvae mortality.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.047.007

Subject Matter Code	11.3
Request for Comment: Fixed Distance from Shoreline Criteria	

Author Name Jacqueline Savitz

Organization Coast Alliance, American Oceans Campaign, Assateague Coastal Trust, Columbia River Deepening Opposition Group, Cape Arago Audubon Society, Northwest Environmental Advocates, Pacific Coast Federation of Fisherman's Associations, Sierra Club-Eastern Shore G

A fixed intake length for all facilities could prove to be problematic in implementation because water bodies all have unique characteristics. We recommend a minimum length [as defined in the document] with additional length mandated for site-specific issues such as sensitive habitat.

EPA Response

EPA is not establishing a fixed intake length in this rule. After reviewing available data and comments, EPA has adopted an alternative regulatory structure in this rule and will not set nationally defined areas within waterbodies where different requirements apply for best technology available for minimizing adverse environmental impact. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.047.008

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Jacqueline Savitz

Organization Coast Alliance, American Oceans Campaign, Assateague Coastal Trust, Columbia River Deepening Opposition Group, Cape Arago Audubon Society, Northwest Environmental Advocates, Pacific Coast Federation of Fisherman's Associations, Sierra Club-Eastern Shore G

Of the three main alternatives outlined for defining "adverse environmental impacts," we support the use as defined as "any impingement of entrainment of aquatic organisms," a definition that builds upon the 1977 guidance language. Using a 1% threshold opens up disputes over population estimations and community abundance. Similarly, using a reference site for determining adverse impacts would almost certainly prove contentious.

EPA Response

Please see response to comment 316bNFR.029.013 and section VI.B of the preamble to today's rule. EPA agrees with the commenter that estimating populations, determining community abundance, and defining reference conditions can be difficult and fraught with uncertainty and subjectivity. This is one of the primary reasons EPA is seeking to minimize AEI by measuring reductions in entrainment and impingement under this new facility rule.

Comment ID 316bNFR.047.009

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Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

The primary environmental concern with intake structures should be those focused on the aquatic environment. While non-aquatic concerns are valid and should be considered secondarily, the main effect of these facilities is to the aquatic communities and the decision-making process should reflect this priority.

EPA Response

EPA agrees with the comment. See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Comment ID 316bNFR.047.010

Subject Matter Code	MISC
	Miscellaneous Comment

Author Name Jacqueline Savitz

Organization Coast Alliance, American Oceans Campaign, Assateague Coastal Trust, Columbia River Deepening Opposition Group, Cape Arago Audubon Society, Northwest Environmental Advocates, Pacific Coast Federation of Fisherman's Associations, Sierra Club-Eastern Shore G

We applaud the administration's intent "to ensure protection and propagation of a balanced indigenous population of shellfish, finfish, and wildlife." To that end, we believe that the fundamental nature of the water body's physical components must not be altered as the result of intake activities. In aquatic communities, especially those in estuarine and marine areas, organisms have developed behaviors that coincide with the physical attributes in the water. For example, some larvae migrate within the water column based on temperature and salinity gradients. In this situation, removal of large amounts of either salt or fresh water would obliterate the gradients, fundamentally changing the larvae response. In this way, the entire community structure of an estuary can completely transformed due to alterations to its physical components. We urge the administration to look not only at the direct effect on aquatic communities, but also the possible secondary effects due to changes in physical parameters and characteristics, such as temperature, salinity, and stratification.

EPA Response

EPA acknowledges that there are multiple types of adverse environmental impact including impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function.

EPA also recognizes that cooling water intake structures are not the only source of human-induced stress on aquatic communities. These stresses include, but are not limited to, nutrient loadings, toxics loadings, low dissolved oxygen content of waters, sediment loadings, stormwater runoff, and habitat loss. While recognizing that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, the Agency identified methods for evaluating more generally the stresses on aquatic communities from human-induced perturbations other than fishing. Of particular importance is the recognition that stressors that cause or contribute to the loss of aquatic organisms and habitat due to physical parameters and characteristics may incrementally impact the viability of aquatic resources. EPA examined whether waters meet their designated uses, whether fisheries are in stress, and whether waters would have higher water quality or better support their designated uses if EPA established additional requirements for new cooling water intake structures. EPA considered use of this type of information as one approach for evaluating adverse environmental

impact.

Comment ID 316bNFR.047.011

Subject Matter Code	11.14
	Littoral Zone in Oceans

Author Name Jacqueline Savitz

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This proposal creates an uneven playing field that could be interpreted by power companies to minimize options for siting facilities to coastal locations. Since other factors will come into play in siting plants in coastal locations (i.e. space considerations, disaster response issues, community acceptance) companies should not be limited to coastal areas in their site selection. However, to the extent that new facilities are sited on the coasts as a result of this uneven playing field, the proposed regulation creates undue pressure on the very coastal resources on which estuarine and terrestrial resources, as well as the U.S. economy, depend.

EPA Response

EPA understands that with the approach of today's rule, some locations may be restricted. However, owners and operators of new facilities have more flexibility in designing facilities that can meet the requirements of today's rule in a cost effective manner. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.047.012

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The environmental technology industry has come a long way in the past three decades and the Best Technology Available should be promoted. Dry cooling, and to a lesser extent, wet cooling, are examples of ways in which the electricity generation industry can substantially reduce its impacts on the environment. It is critical that these technologies be promoted through these regulations. Otherwise cooling water intakes in most U.S. waters will be doomed in the future, to continue to operate they way their predecessors did, rather than in a way that is environmentally sound.

EPA Response

EPA agrees with the commenter. EPA wholeheartedly promotes dry cooling and recirculating wet cooling as means by which the electricity generation industry can substantially reduce its impacts on the environment. Although EPA has rejected dry cooling technology as the technology basis for the rule's requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas).

The final rule reflects technology-based performance requirements based, in part, on recirculating closed-cycle wet cooling. As such, the recommendation of the commenter is met.

Comment ID 316bNFR.047.013

Author Name	Jacqueline Savitz
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Subject Matter Code 10.01

Regulatory Framework Options

We are disappointed in the Agency's failure to properly identify the Best Technology Available for any waters of the United States including Essential Fish Habitat. Further, we are extremely concerned about the minimal technology requirements proposed for oceans, lakes and rivers beyond the littoral zone.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) for all waterbody types.

Comment ID 316bNFR.047.014

Author Name	Jacqueline Savitz
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Subject Matter Code 10.03

Additional Littoral Zone Requirements

The agency's definition of the littoral zone is extremely problematic and could exclude many very important habitats, resulting in continued significant impacts on aquatic life, even from new facilities constructed in the 21st century.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.047.015

Subject Matter Code	6.1
Current Implementation of Sec. 316(b)	

Author Name Jacqueline Savitz

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As you know, America's oceans, lakes, rivers, bays and estuaries provide critical habitats for a plethora of interdependent wildlife. EPA has reported that much of our nation's aquatic habitat is currently not fully achieving its designated uses. This is because past methods of managing environmental impacts have not been sufficient. New regulations need to move us forward and this one is no exception.

EPA Response

EPA believes that today's rule will help further the objectives of the CWA. See section II of the preamble for discussions on the legal authority, purpose and background of today's final rule. See also section V for a discussion of the basis for today's final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Joseph E. Fulton

On Behalf Of:

City Public Service

Author ID Number:

316bNFR.048

Note

Fully supports the comments made by APPA and LPPC (316bNFR.043)

Comment ID 316bNFR.048.001

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Joseph E. Fulton

Organization City Public Service

City Public Service (CPS) owns 4820 megawatts of electric generating capacity in Bexar County, Texas - all of which is subject to regulation under the federal NPDES permitting system. The majority of this generating capacity (4140 MW) is located at two cooling lakes owned and operated by CPS. The cooling lakes serve as closed cycle cooling facilities where cooling water is drawn from the lakes, circulated through the condensers of the generating units then discharged back to the lake. The intake and discharge points are located sufficiently far from one another that significant cooling is accomplished through the thermodynamic mechanisms of radiation, convection, conduction and evaporation. In this manner the cooling lakes serve the same function as other closed cycle cooling systems such as cooling towers except that cooling lakes rely less on evaporation and thus consume less water than do cooling towers.

The cooling lakes were created as off channel lakes by damming normally dry or intermittent creeks and relying upon imported water as the source of makeup to keep the lakes filled. Without the import of water the lakes would soon become dry holes, unable to support any aquatic ecosystems. The makeup water used to maintain lake levels is derived principally from treated sewage effluent pumped from the San Antonio River, a nearby perennial stream. The two cooling lakes are known as Braunig Lake (1350 acres), constructed in 1961 and Calaveras Lake (3550 acres), constructed in 1968. The first generating unit at the lakes went into service in 1966 and the last unit was just put into operation in the spring of 2000. Eight electric generating units went on line at these lakes in 1966, 1968, 1970, 1972, 1974, 1977, 1978, and 2000. Although construction of new generating facilities has proceeded more or less continuously since 1966, these two cooling lakes have sufficient unused cooling capacity to accommodate the construction of another 1000-1500 megawatts of new generating capacity or two to three new generating units. CPS is concerned that the rules being proposed by EPA will undermine CPS' ability to completely utilize the cooling capacity of these cooling lakes thereby causing extensive environmental damage and unwarranted economic expense.

EPA Response

This rule does not change the status of cooling lakes under the NPDES program. The applicability of this rule to the commenter's facility, and in particular commenter's cooling lake, must be determined by the permitting authority.

See generally Response to Comment 316b.NFR.068.151.

Comment ID 316bNFR.048.002

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Joseph E. Fulton

Organization City Public Service

EPA's Approach to Regulation of Cooling Water Intake Structures Located in Cooling Lakes Should Recognize the Status of Cooling Lakes as Closed Cycle Cooling Systems and Recognize the Important Environmental and Economic Aspects of Cooling Lakes.

There are approximately 130 cooling lakes in the United States. Cooling lakes are located in 28 states but three states account for well over 50% of the cooling lakes in the U.S. Texas has the most cooling lakes with 48 followed by Illinois with 12 and North Carolina with 10. Most cooling lakes are located in the southern part of the country. Cooling lakes are explicitly recognized as "closed cycle recirculating systems " under the definition provided by EPA in section 125.83 of the proposed rules. In this definition cooling lakes are recognized as utilizing minimized makeup and blowdown flows derived from natural or other water sources to provide contact and noncontact cooling within a facility. This definition implicitly recognizes that the cooling lake, as a recirculating closed cycle cooling system, will necessarily have both recirculating water pumps and intake structures and makeup water pumps and intake structures. CPS is concerned that an inexperienced permit writer could mistakenly impose 316(b) limitations on the recirculating water pumps and intake structures of the cooling lake (i.e. the closed cycle recirculating cooling system) rather than the makeup pumps and intake structures. That would make no more sense than applying 316(b) limits on the recirculating water pumps of a cooling tower rather than on the makeup water system that draws upon waters of the United States for the purpose of supplying makeup cooling water for the cooling tower. EPA's regulations should make it abundantly clear that a cooling lake is itself a recirculating closed cycle cooling system and that pumps and intake structures located within the cooling lake are recirculating water systems that are not affected by these regulations. EPA should make it clear that for the purpose of cooling lakes the makeup water supply system is the only part of the cooling system that comes under the purview of these regulations. Not recognizing this fact would be tantamount to requiring that any new generating units being built at an existing cooling lake (itself a closed cycle cooling system) would be required to construct another closed cycle cooling system (a cooling tower) which would draw its makeup water from the existing closed cycle cooling system which is now prohibited from achieving its full design capacity!

Cooling lakes dissipate heat through the thermodynamic processes of radiation, conduction, convection and evaporation. Cooling towers, on the other hand, are designed to maximize heat dissipation through evaporation. Cooling towers also require blowdown to control salt buildup. Accordingly, cooling towers require almost twice as much makeup water as cooling lakes. Furthermore, cooling lakes can more easily accommodate non-potable water supplies such as treated sewage effluent than can cooling towers. In water short areas such as much of south, central and west Texas, existing cooling lakes are an effective means of conserving water resources.

CPS' two cooling lakes utilize treated sewage effluent from the City of San Antonio's wastewater treatment facilities thus conserving about 35,000 acre-feet of potable water supplies each year. The City of San Antonio relies on the Edwards Aquifer, a sole source supply of potable water for San Antonio's 1,000,000 inhabitants, an aquifer for which the U.S Fish and Wildlife Service has mandated

significant reductions in withdrawals from in order to protect rare and endangered species. It would be ludicrous to mandate by this proposed regulation the use of cooling towers to meet San Antonio's growing demand for energy when unused cooling capacity exists at CPS' two cooling lakes and adequate supplies of non-potable sewage effluent have already been acquired to meet the cooling water needs of any new generating units constructed at the lakes.

The continued development of CPS' two existing cooling lakes to accommodate San Antonio's growing energy needs will conserve potable water resources and protect the rare and endangered species that are dependent upon the Edwards Aquifer and will also save San Antonians more than $100,000,000 - which would be the cost of building cooling towers to serve the additional generating units that could be easily accommodated by the unused capacity at CPS' existing cooling lakes.

Furthermore, the ultimate irony is that the stated purpose of the proposed regulation is to protect aquatic organisms from entertainment or impingement in cooling water systems when those organisms wouldn't even be there except for the presence of the cooling lake. As evidence of the value of the aquatic habitat that is created by the use of cooling lakes consider CPS' two cooling lakes. CPS' two cooling lakes provide a rich and well used aquatic habitat that serves more than 350,000 visitors to the lakes each year. The lakes provide the most significant source of water-based recreation for the inhabitants of the eighth largest city in the U.S. The Texas Parks and Wildlife Department (TPWD) and CPS maintain aggressive fish stocking programs and these lakes are well recognized by anglers for the excellent fishing they provide. The lakes are also used by campers, picnickers and water skiers and are the only significant recreational waterbodies in Bexar County.

Finally, there is additional environmental benefit to be gained by allowing the full development of the nation's existing cooling lakes. New generating units can be built at existing cooling lakes without the need for additional land purchases and its attendant environmental impact. Existing cooling lakes already have adequate transmission line capacity, are readily accessible by rail and road and have fuel handling and management capabilities that would have to be re-created at any new greenfield facility. It makes perfect economic and environmental sense to take full advantage of these economic and environmental benefits but these benefits are put at risk unless EPA adopts specific regulations allowing for the continued development of unused cooling capacity at the nation's existing cooling lakes. These simple facts concerning CPS' cooling lakes offer powerful arguments why EPA needs to allow for site-specific conditions which take into account local and community concerns as well as specific rules that will not impair the continued development of unused cooling capacity at the nation's existing cooling lakes

EPA Response

The final rule recognizes that cooling lakes can be part of a closed-cycle recirculating system, which EPA agrees conserves water resources. The determination of whether a cooling lake is a "water of the U.S." is made on a case-by-case basis by the permitting authority through application of 40 CFR 122.2.

See Response to Comments 316b.NFR.068.001 and 316b.NFR.068.151.

Comment ID 316bNFR.048.003

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Joseph E. Fulton

Organization City Public Service

The EPA Should Adopt a Straightforward and Simple Approach to Allowing the Continued Development of the Nation's Existing Cooling Lakes.

The economic value and environmental benefits of allowing the continued development of unused cooling capacity at the nation's existing cooling lakes is substantial. The problem lies with the direction being pursued by EPA in this rulemaking proceeding that if unchanged would require any new generating units being built at an existing cooling lake to use cooling towers instead of utilizing the unused cooling capacity of the existing cooling lake. This problem is grounded in the terminology being used by EPA in this rulemaking. The use of terms such as "waters of the United States" or "navigable waters" is sufficiently broad as to bring existing cooling lakes under their reach. This, combined with the limited number of classifications of waterbodies being proposed by EPA in this rulemaking make it almost certain that any new generating units being built at existing cooling lakes in the US will have to employ cooling towers or some other closed cycle cooling system rather than relying upon the unused cooling capacity of the cooling lake.

Past attempts to recognize the value of cooling lakes seemed to get bogged down in definitional issues concerning navigable waters or waters of the U.S. The dilemma can easily be resolved by adding a definition for existing cooling lakes that recognizes four or five very important and deterministic characteristics of cooling lakes. Additionally, CPS does not propose that all lakes that have heat being discharged to them are cooling lakes. CPS does contend that all existing cooling lakes share certain defining characteristics that make them cooling lakes. First, they must be in existence as of the date of the proposed rule (8/10/2000). Second, they must have been built primarily for the purpose of providing a heat sink for electric generating units. Third, they are artificial impoundments created by impounding a non-perennial stream. Fourth, lake levels can only be maintained on average by importing water from some other waterbody or source of water supply. Fifth, they are owned or controlled by or operated for the benefit of the entity that operates the electric generating facility utilizing the cooling lake. Of the 48 cooling lakes in Texas (see Table 1 {attachment 316bNFR048_Table}), several would not meet some of these criteria and would therefore be considered lakes or reservoirs as defined by the present language in the proposed rule. For those facilities that meet the proposed definition of a cooling lake the EPA should make it clear that intake and discharge structures built to take advantage of unused cooling capacity in existing cooling lakes would not be covered under this rule; instead, the intake structure being affected by the proposed rule would be any intake structure that is being added or modified to divert water from another waterbody into the cooling lake. Provided, however that that intake structure would otherwise meet the requirements for regulation under the proposed rule.

EPA Response

This final rule does not define the term "cooling ponds" (or cooling lakes) or change the status of cooling ponds under the Clean Water Act. The final rule recognizes that cooling lakes can be part of

a closed-cycle recirculating system, which EPA agrees conserves water resources. However, in certain circumstances cooling ponds (or cooling lakes) can be "waters of the U.S." See 40 CFR 122.2. This determination is made on a case-by-case basis. The applicability of this rule to any new facility, and in particular the cooling lake at that new facility, must be determined by the permitting authority.

See Response to Comments 316b.NFR.048.001 and 316b.NFR.068.151.

Comment ID 316bNFR.048.004

Subject Matter Code 7.3

Definition: Waters of the US

Author Name Joseph E. Fulton

Organization City Public Service

If the EPA adopts a common sense definition for existing cooling lakes and makes it abundantly clear that the regulations being proposed in this rulemaking do not attach to any existing or new intake or discharge structures built within the cooling lake proper then it will reduce the adverse environmental impact created by building new cooling systems and save Americans billions of dollars in costly and unnecessary cooling towers.

EPA Response

See Response to Comment 316b.NFR.048.003.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

John W. Fainter, Jr.

On Behalf Of:

Assn. of Electric Companies of Texas,
Inc. (AECT)

Author ID Number:

316bNFR.049

Note

Fully supports the comments made by UWAG (316bNFR.068)

Comment ID 316bNFR.049.001

Author Name	John W. Fainter, Jr.
Organization	Assn. of Electric Companies of Texas, Inc. (AECT)

Subject Matter Code 10.012

Lake/Reservoir--Proposed Standards

Other than the occasional ox-bow, the only natural lake in Texas is Caddo Lake. Located in the far east portion of the State, and shared with Louisiana, Caddo Lake was created by seismic activity approximately 400 years ago. All other "lakes" in Texas are actually manmade reservoirs. These reservoirs have been constructed for single or multiple purposes to provide potable water sources, flood control, recreation (i.e., boating, swimming, skiing, sports fisheries, etc.) and/or industrial use.

In general, these reservoirs are impoundments of the main channel of a river or stream. They are relatively shallow, often with gently sloping bottoms over a wide variety of substrates. One of the most important aspects of these reservoirs is that seasonal pool level fluctuations are expected. Each reservoir, and its dam or retaining structure, is designed for a specific target normal pool level or water elevation. The normal pool level is determined to be the optimum storage capacity, but it is a target, not a constant. Water releases are generally managed in two ways. Some reservoirs utilize a passive overflow or spillway system that allows all water above a certain level to escape. At other reservoirs, the managers strive to maintain the pool level through mechanical gates or valves by either retaining or releasing water. Frequently there is also some form of continuous flow-through to maintain downstream conditions. Because of water rights and dam safety concerns, above-normal pool levels usually do not occur for extended periods of time. It is not, however, unusual for reservoirs in Texas and the southwest to be well below normal pool levels by the end of the summer season because of the seasonally dry/hot temperatures and high evaporation rates.

With no natural true "lake" flora and fauna present, these reservoirs support a combination of introduced lacustrine and adaptive riverine fish species. The fisheries in the public reservoirs are usually stocked and managed to support sports fishing, a major recreational industry in the State. The usual fish stocking regimes include predator species, strains and hybrids (e.g., largemouth bass, catfish, crappie, etc.) and prey species/hybrids such as sunfish, minnows and shads. For example, in 1998 the Texas Parks and Wildlife Department (TPWD) stocked over 8 million Florida-strain largemouth bass. Over time, and at various locations, the State has also introduced striped bass, redfish, carp, tilapia, and other non-native species. There are also a growing number of invasive exotic faunas present or threatening, such as Asiatic clams, zebra mussels, and a recently discovered mud crab.

With little natural seed bank present, and no managed vegetation stocking program, the reservoir's aquatic flora develops slowly and can result in unbalanced and/or low diversity plant communities. In recent years, many reservoirs have become increasingly dominated by exotic nuisance plants such as hydrilla (Hydrilla verticillata). These invasive plants often have a negative effect on the fisheries by reducing the available nesting/spawning areas, influencing recruitment of certain species, and frequently shifting the location of the littoral zone by altering the depth of light penetration and the associated dissolved oxygen levels.

From this description, it is easy to see that such reservoirs represent a contrived ecosystem. The fisheries are created, modified, and managed for a variety of human needs, with little initial natural

material or circumstances to build from. This is not to say that they do not support successful and sustainable fisheries, only that the terms "natural," "typical," or "balanced indigenous community" are not appropriate. The eco-system and characteristics of each reservoir is unique, and each reservoir should be viewed independently.

EPA Response

See response to comment 316bNFR.017.004.

Comment ID 316bNFR.049.002

Subject Matter Code 125.83.14

Definition: Littoral Zone

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

Littoral Zone: The proposed definition of "Littoral Zone" is at times either too specific or too vague. A littoral zone, for fresh water, is defined in The Oxford Dictionary of Natural History (1985) as:

"The zone in shallow fresh water and around lake shores where light penetration extends to the bottom sediments, giving a zone colonized by rooted plants."

This is a widely accepted description of a concept that can only be defined in general terms. The concept of a littoral zone, and its description, does not lend itself for use as a rigorous regulatory tool. This is because the location and/or the depth of a littoral zone is often dynamic, and is influenced by many natural and anthropogenic factors. Some of these factors are:

water level fluctuation (extended periods of drought or of excessive rainfall)
water quality (turbidity, nutrients, pH, etc.)
water temperature (ambient, heat load, etc.)
water movement (wave action, velocity, etc.)
flora and fauna (native or exotic, natural or stocked, species diversity, etc.)
temporal influences
waterbody latitude (solar exposure)
waterbody bottom topography and/or bathymetry
waterbody uses
source water
substrate
surrounding land type and use

Many of these factors can be somewhat related, or even highly interdependent, but a change to any one factor can alter the location and/or depth of the littoral zone. How would the littoral zone of a new reservoir be determined? Would its purpose, or eventual use be considered? Would the expected increased productivity and diversity be considered?

In addition to the season pool level fluctuations discussed earlier, drought conditions create another concern. Currently, many areas of Texas are in a five-year drought period. During this time, many reservoirs have experienced extended periods of below normal pool level elevations. Littoral zones have been established at locations and depth that will not survive, when and if, normal pool levels return.

What if natural conditions are reasonably expected to periodically and dramatically alter the location and depth of the zone for extended time spans?

Land use and development, particularly in urbanized and/or agricultural areas, often result in dramatic changes to a littoral zone. Changes in land use can result in alteration of water quality (e.g., sediment

loading, changes in nutrient values, etc.). It can also change the solar loading, wind/wave effects, and species diversity. Upstream or source water diversions can alter the littoral zone by changing the in-source flows, flow regiments, or entry points.

For Texas reservoirs, there are also several specific terms and concepts in the proposed definition that is ambiguous or overly broad. The phrase "level of highest seasonal water" is far too broad. It does not consider natural disasters such as floods, or brief, unusually high water levels due to heavy rains. In both of these cases, large areas of land that do not perform a function similar to a littoral zone would be included in the scope of the definition. A better phrase would be "average high water mark" which would limit the inclusion of normally upland or otherwise dry areas. In addition, the phrase "to the deepest point at which submerged aquatic vegetation can be sustained (i.e., the photic zone . . .(etc.)" is ambiguous. The word "can" creates a problem. There are many locations where because of light penetration, slope, and substrate, submerged aquatic vegetation "could" or "can" be supported, but because of other natural forces (i.e., wave action, water currents, etc.) they do not. The word "can" however, would result in the inclusion of such areas with the definition. If an area does not support the function, it should not be included. To do so would only compromise the concept and result in costly expenditures to avoid areas that are incorrectly identified as a littoral zone by the proposed definition.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define the best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.049.003

Subject Matter Code 125.83.6

Definition: Design Intake Velocity

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

Design Intake Velocity: Based on the discussions provided in the preamble concerning the various types of velocities associated with an intake structure, the definition offered appears to be unfounded, or at the least, inappropriately applied. It also appears that the 0.5 ft/s (feet per second) is somewhat of a "magic" number, without pedigree.

For Texas reservoirs, the establishment of a requirement to meet a fixed velocity at virtually all possible water elevations is incredibly onerous. As discussed earlier, pool level fluctuations are normal, and on some occasions, dramatic. Changes in pool elevation will necessarily result in changes to the intake velocity. As a system tries to maintain a water intake rate from a decreasing source, the velocity will increase. In order to account for both the reasonably expected, and drought induced unexpected fluctuations, the overall size of an intake structure must be increased several times over. This will dramatically increase the cost of siting, construction, operation, and maintenance. In the case of designing for a drought, undoubtedly the cost would be wholly disproportional to the environmental benefits expected. It may also have societal cost in aesthetics and by limiting access to larger portions of a waterbody for anglers and other recreational users.

Another consideration is that during a typical year, the low pool levels occur during the late summer/early fall period. This is well after the spawning/nursery seasons for the large majority of fish species, particularly those that would be considered representative species found in Texas reservoirs.

For the reasons discussed above, AECT is convinced that a case-by-case velocity standard, as opposed to mandatory uniform national velocity standards, would be a justifiable approach for limiting impingement. Also, any velocity value used should be the approach speed, not the through screen.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

EPA has concluded that the design through screen velocity requirements is achievable and economically practicable. Many existing facilities already meet the requirement, as EPA notes that more than 70 percent of the manufacturing facilities and 60 percent of the electricity generating facilities built in the past 15 years. EPA also estimated the costs for the requirement based on a variety of conditions, including different intake velocities and different technologies. See Chapter 2 of the Technical Development Document.

EPA does not anticipate that this requirement will limit recreational access or substantially impact aesthetics. Larger screens or branched intake structures may lead to some additional structures in the waterbody or along the shoreline, but the overall impact to the waterbody is likely to be minimal. EPA also believes that a larger or branched intake structure will not have a substantial impact on aesthetics, as the intake structure is already a component of a larger man-made facility bordering the waterbody. An increase in intake screen area is likely to be relatively small in comparison to the "footprint" of the entire plant on the visual landscape. Additionally, the Corps of Engineers will issue a CWA 404 permit on all intake structures. These permits are more broadly defined and are generally better suited to handle issues such as recreational access, navigation, and aesthetics.

Comment ID 316bNFR.049.004

Subject Matter Code 125.83.17

Definition: Natural Thermal Stratification

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

Natural Thermal Stratification: The concept and description of a Natural Thermal Stratification, like Littoral Zone, does not lend itself for use as a rigorous regulatory tool or benchmark. In addition, the concerns expressed in the preamble discussion on protection of a "natural thermal stratification" miss the point and are based on an erroneous assumption. Indeed, the use of hypolimnion water is actually more protective of the aquatic biological community. This is due to the depressed dissolved oxygen levels found in that zone. There is little or no biological activity present. Thus, in most cases, any water withdrawn from that zone displaces a like volume of the more biologically active water from the upper zone, or epilimnion. This would, in fact, serve to reduce the number of aquatic organism that are impinged or entrained.

In Texas reservoirs, natural thermal stratification (which would seem to be very similar to a thermocline) is both temporary and inconsistent in both the temporal and spatial context. In fact, in many years, it is either not present, or so restricted it cannot be easily located. The occurrence and location of a thermal stratification is highly dependent on a number of natural factors such as seasonal ambient temperatures, water clarity, water depth, etc. Changes, or alterations, in any one of these factors affect if, when, or where a natural stratification occurs. There are also a number of anthropogenic factors, which may not be considered "natural," that can alter the occurrence and location of a thermal stratification. These include source water inflows, water withdrawals, water uses, wastewater discharges, and flow/level management practices (e.g., many reservoirs release water from below the surface, close to deepest areas).

Because of the many factors involved, it is not possible to accurately predict if, when or where a "natural thermal stratification" will develop. It may not be possible to state and verify that an intake structure's operation will never alter it. If a "natural thermal stratification" is similar or synonymous to a thermocline, then it would be based on a sharp vertical drop in temperature 1C per meter. Using that description, even the introduction of the heat load from a power plant's once-through cooling water discharge (usually 1C above ambient water temperature), which is supplied by the cooling water intake structure, is also a factor. It seems ironic that in using the definition and requirements presented in these proposed regulations, if a natural thermal stratification is present, a failure to operate the cooling water intake structure could result in an alteration of natural thermal stratification. Of course, the opposite could also be true.

Considering the natural variability in the occurrence, location, the scope, and the number of other factors that have influence, particularly in Texas reservoirs, it may not be possible to design an intake structure that will never result in an alteration of a thermal stratification. Considering the lack of biological activity below any "natural thermal stratification", avoiding that zone may actually increase the number of aquatic organisms that may be impinged or entrained.

For the reasons described above, AECT believes EPA's proposed "no alteration of natural thermal stratification" standard for new CWISs in lakes and reservoirs should be abandoned because it is ill-

founded, impossible to implement, and based on a significant error in understanding of the biology associated with stratification.

EPA Response

EPA believes the natural thermal stratification of a lake, if present, influence the physical and chemical cycles of lakes, which, in turn, strongly govern their production, utilization, and decomposition. A facility with a disproportionately large water intake can adversely impact both primary and secondary production. EPA believes the intake capacity standard for lakes and reservoirs is economically practicable and technologically achievable for new facilities, and will result in an acceptable level of source water protection.

EPA has revised the language at Section 125.84 of today's final rule to read as follows:

"For cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);"

A site-by-site determination of the desirability of any natural thermal stratification, if any, will be made by the permitting authority.

Comment ID 316bNFR.049.005

Subject Matter Code 125.84.2

Compliance in Lake

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

Location of Cooling Water Intake Structure - §125.84(c)(1-2)

For the reasons already described in the previous comments on the definitions of Littoral Zone, Design Intake Velocity, and Natural Thermal Stratification, AECT believes that a case-by-case evaluation of a CWIS location and possible impacts, as opposed to mandatory uniform national requirements, would be a more justifiable, appropriate, and fiscally sound approach for regulating impingement and entrainment.

AECT is also very concerned over the Agency's narrow view on possible site locations for a CWIS. Based on the discussion provided in the preamble, it appears that the Agency contends that the only way to protect a littoral zone is by constructing a CWIS some distance away from the shoreline, into the waterbody. EPA fails to consider options that could allow a shoreline, or recessed, CWIS that could be constructed without a close proximity to a littoral zone. If the area selected, or constructed, is large enough and does not have the slope, substrate, or other qualities that could support submerged aquatic vegetation, then it would not present an increased threat.

EPA Response

EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. EPA also understands that with the approach of the rule, some locations may be restricted. However, owners and operators of new facilities have more flexibility in designing facilities that can meet the requirements of today's rule.

Today's final rule, apart from the proportional flow requirements, does not include specific national requirements for new facilities based on location of the cooling water intake structure. After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II

and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches, including moving the location of the intake structure. Owners and operators of new facilities have more flexibility in designing facilities that can meet the requirements of today's rule in a cost-effective manner.

Comment ID 316bNFR.049.006

Subject Matter Code 125.84.2

Compliance in Lake

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

§125.84(c)(2)(iii): The requirement to reduce intake flow to a level commensurate to that of a closed-cycle recirculating system is shortsighted and unduly onerous. It fails to recognize pool level fluctuations, which would naturally increase flow during high water periods or the physics of a once-through cooling water system. Most closed-cycle systems result in a higher rate of water consumption through evaporative loss, and they also produce wastewater streams such as blowdown. Once-through systems, on the other hand, have a comparatively low consumption and do not produce other wastewaters. In Texas, and the southwest, water conservation is imperative.

EPA Response

EPA has determined that, at a national level, the best technology available for minimizing adverse environmental impact from entrainment is by reducing intake flow to levels commensurate with closed-cycle recirculating systems. EPA recognizes that there is some evaporative loss and wastewater generation but believes that the benefits derived from reducing intake flows outweigh the negative aspects. Additionally, new facilities are required to minimize make-up and blowdown flows, thereby minimizing the impacts associated with those flows and increasing the efficiency of the facility. See Section V.A. in the preamble to today's rule.

If there are local issues associated with the permitting, such as water conservation, the applicant may follow Track II and demonstrate reductions in impingement and entrainment to the same level that would be achieved under Track I.

Comment ID 316bNFR.049.007

Subject Matter Code 125.84.2

Compliance in Lake

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

§125.84(c)(2)(iv): A requirement to implement additional design and construction technologies is very shortsighted, inflexible, and quite possibly unnecessary. It fails to even consider that in certain situations, additional technologies may not be needed. In those cases, this requirement would only result in significantly increased cost with no, or tenuous, environmental benefit.

EPA Response

EPA is not mandating any specific design and construction technologies and is adopting a site-specific approach where facilities have the flexibility to propose technological solutions appropriate for their site conditions where additional controls are needed. The final rule requires facilities withdrawing more than 10 MGD choosing Track I to select and install additional design and construction technologies if they locate in certain areas where fish or shellfish resources need additional protection. See § 125.84(b)(4) and (5). Facilities withdrawing between 2 and 10 MGD can choose to follow the Track I requirements of § 125.84(c) but, if they do, they must select and install design and construction technologies at all locations. See § 125.84(c)(3). Facilities that choose to follow Track II must install design and construction technologies only in certain areas. See § 128.84(d)(4) and (5).

Comment ID 316bNFR.049.008

Subject Matter Code 125.86

Information to Collect

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

National Pollutant Discharge Elimination System (NPDES) Permit Information - §125.86(a-b)

Source Water Baseline Biological Characterization: These requirements fail to consider several important factors or scenarios. What if the reservoir is not yet constructed, how would this characterization be conducted? Although some general concepts and expected physical characteristics can be projected or pulled from the literature on similar reservoirs, it would certainly not address many of the details specified.

There is also the question of the reservoir's maturation. The biological and physical characteristics of a newly inundated reservoir is extremely dynamic. The initial characteristics cannot be used to project those same characteristics once its flora and fauna more fully matures. In Texas, the maturation process is slow, often requiring at least ten years or more before the biological communities achieve a somewhat stable relationship. Many of the fish species found in the first several years will not be present in year 10, and many of the plant species found in year 10 were not present in the first several years. As a result, a true sustainable littoral zone will often not develop until late in the process.

In both instances discussed above, the required baseline monitoring would either be impossible or of little real use. Delaying the construction of a facility until the reservoir has been constructed and has reasonably matured would be fiscally unacceptable.

EPA Response

See Response from Comment 316bNFR.017.011.

Comment ID 316bNFR.049.009

Subject Matter Code	125.87
	Monitoring

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

§125.87(a)(1-2) Biological Monitoring: The post operational monitoring proposed in this section is unnecessarily onerous and inappropriate in the cost, frequency, scope, documentation, and manpower requirements. The projected cost offered by the Agency is grossly underestimated, possibly by an order of magnitude. It appears that the Agency failed to recognize the complexity of the biological monitoring and the highly specialized equipment, personnel, and supporting biological expertise needed to accomplish the described task.

There are also other flaws. Although the proposed rules offer the possibility that the biological monitoring frequency can be reduced after two years, the method identified to obtain permission to reduce monitoring is cumbersome at best. Evaluation and preparation of the data collected during each biological monitoring effort will not be immediate, and in most cases will take several months. Then, only after two years of data has been assembled, evaluated, and prepared, can the permittee request a reduction in frequency. The Director then must consider the data and respond to the request (note: there is no time requirements imposed on the Director). During this period, the permittee must continue the initial biological sampling frequency until the Director responds. Given the probable time involved in this process, even if the Director responds favorably, the permittee has been forced to continue the burdensome task and cost of biological monitoring well beyond the initial two-year period.

Additionally, the frequency identified for the biological testing is too prescriptive, and in fact, may not be possible. The proposed sampling frequency fails to consider a number of factors. First, as previously discussed in the case of a new reservoir, this sampling would be of little use or value. Second, EPA fails to consider the operation of the CWIS. Depending on the size and type of generating unit the intake structure is supporting, the CWIS may not operate every month or it may not operate a sufficient period of time during a month to support the sampling requirements. There may also be periods when the CWIS, and the associated unit, does not operate, or does not operate at full capacity, due to unforeseen mechanical problems.

Third, the complexity and logistics of these types of sampling events is often tremendous, requiring a great deal of preparation and planning. Any unforeseen circumstances, involving either CWIS operational/mechanical problems, sampling equipment failures, or unsafe weather conditions could delay or abort the sampling event. For these, as well as other reasons, a strict monthly and bi-monthly sampling requirement is not realistic, workable, or necessary.

EPA Response

See Response to Comment 316bNFR.017.012. EPA believes that the facility's monitoring plan should address numerous contingencies, including that of unsafe weather conditions.

Comment ID 316bNFR.049.010

Author Name	John W. Fainter, Jr.
Organization	Assn. of Electric Companies of Texas, Inc. (AECT)

Subject Matter Code 125.87

Monitoring

§125.87(b) Velocity Monitoring: The required velocity monitoring also presents a number of problems. Foremost is the requirement that "the head loss across the intake screen must be measured at minimum ambient source water surface elevation." As previously described, Texas reservoir elevations can vary greatly and often because of unpredictable and uncontrollable factors. In most cases, it will not be possible to recognize or insure that the source water surface elevation measured is ever the true minimum. The problems identified in the previous discussion of CWIS operation, or operation at a reduced capacity also applies here, even for quarterly monitoring.

EPA Response

EPA recognizes that in certain circumstances it may not always be possible to recognize or insure that the source water surface elevation measured is the true minimum. Therefore, Under § 125.87(b), Track I facilities are required to monitor the head loss across the intake screens to obtain a correlation of those values with the design intake velocity (Track I) or other specified velocity (Track II) at minimum ambient source-water surface elevation (according to best professional judgment based on available hydrological data).

The Agency considers this the most appropriate parameter to monitor, because, although the facility might be designed to meet the requirement, proper operation and maintenance is necessary to maintain the open area of the screen and intake structure, ensuring that the design intake velocity is maintained. Head loss can easily be monitored by measuring and comparing the height of the water in front of and behind the screen or other technology.

Comment ID 316bNFR.049.011

Author Name	John W. Fainter, Jr.
Organization	Assn. of Electric Companies of Texas, Inc. (AECT)

Subject Matter Code 125.87

Monitoring

§125.87(c) Visual Inspections: The requirement for weekly visual inspections to ensure that the various technologies are operating and functional implies a dramatic effect on operation of the CWIS and the associated generating unit(s). Not all technologies must or should be operated continuously, and occasionally some technologies may not operate due to mechanical problems. Depending on the specific situation, it is not necessary or reasonable to suggest that all technologies should be available or operating continuously, and that periodic outages of various technologies is not acceptable.

The proposed frequency of inspections (i.e., weekly) is excessive and burdensome. With advances in electronics and computers, remote monitoring will be available for practically every situation, making frequent documented visual inspections unnecessary. Also, as discussed several times in the preamble, depending on the waterbody type, location, etc., impingement and entrainment are typically not a fifty-two week per year concern.

EPA Response

EPA does not believe that the proposed frequency of inspections (i.e., weekly) is excessive and/or burdensome. Weekly visual or remote inspections are required to provide a mechanism for both the new facility and the Director to ensure that any technologies that have been implemented for minimizing adverse environmental impact are being maintained and operated in a manner that ensures that they function as designed. EPA has promulgated this requirement so that facilities that develop plans and install technologies could not operate them improperly so that adverse environmental impact is not minimized to the extent expected. The Director would determine the actual scope and implementation of the visual inspections based on the types of technologies installed at your facility. For example, inspections could be as simple as observing bypass and other fish handling systems to ensure that debris has not clogged the system and rendered it inoperable.

Comment ID 316bNFR.049.012

Subject Matter Code	125.88
	Records and Reporting

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

Recordkeeping and Reporting - §125.88(b)(1-3)

The requirement to submit the records of biological monitoring, velocity and head loss monitoring, and visual inspections, is excessive and also has many hidden problems. The submittal of the actual records is an unusual permit requirement and of questionable value. The sheer volume of the records created to document these requirements for one CWIS will be huge, and unless the Agency mandates the format, will vary greatly from facility to facility. These records, as with other similar permit related monitoring programs, should be maintained and available for review upon request by the Director (see §125.88(a)). If this information must be submitted, then a summary report that includes data on each of these monitoring requirements would be a much simpler, efficient, and relevant method.

EPA Response

EPA requires this information in order to allow permit writers full access to information pertinent to the permit, especially in evaluating the potential need for more stringent requirements at the facility. EPA also believes that the volume of required information is small and does not impose an inappropriate burden upon either the applicant or the permitting authority. The format of these records is flexible and will be determined on a case-by-case basis by the permitting authority.

Comment ID 316bNFR.049.013

Author Name	John W. Fainter, Jr.
Organization	Assn. of Electric Companies of Texas, Inc. (AECT)

Subject Matter Code 10.01

Regulatory Framework Options

AECT's experience and knowledge of Texas reservoirs show that a highly prescriptive program utilizing a set of national criteria is not necessary, appropriate, or workable for our region. While any benefits would be negligible, the costs would be staggering. In addition, many of the siting/operational requirements, and the assumptions on which they are based, have been shown to be faulty, unfounded, or incorrect.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that establishes specific capacity, velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment impacts while also allowing flexibility by including a performance-based alternative. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

Comment ID 316bNFR.049.014

Author Name	John W. Fainter, Jr.
Organization	Assn. of Electric Companies of Texas, Inc. (AECT)

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

The same knowledge and experience also shows that such a regulatory program must consider the unique physical conditions and biology of each waterbody, as well as other factors such as location, climate, cost, etc. AECT believes that EPA should reconsider its entire approach, and in light of the information provided in these comments, develop a more flexible, workable, site-specific, and cost-effect methodology. Any new approach should provide the regulated community the opportunity to either meet a set of conservative measures or show that because of the site-specific circumstance, their CWIS design and location will be protective and minimize any impacts.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.049.015

Subject Matter Code OPP

General Statement of Opposition

Author Name John W. Fainter, Jr.

Organization Assn. of Electric Companies of Texas, Inc. (AECT)

AECT is very concerned with EPA's overly prescriptive proposed rule and does not believe utilizing a set of national criteria for cooling water intake structures for new facilities is necessary, appropriate, or workable for the State of Texas.

Based on our unique experience and knowledge of Texas reservoirs, AECT feels compelled to comment on these overly prescriptive yet non-site specific proposed regulations.

EPA Response

EPA responds to each specific comment elsewhere in this comment response document.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

John I. Nelson

On Behalf Of:

New Hampshire Fish and Game Dept.

Author ID Number:

316bNFR.050

Comment ID 316bNFR.050.001

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

Subject Matter Code 10.01

Regulatory Framework Options

In general, we find the proposed rules reasonable and well thought out. Indeed, the discussion of cooling water intake environmental risk potentials and the methods available for minimizing them is quite thorough.

EPA Response

EPA appreciates the commenter's support.

Comment ID 316bNFR.050.002

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

Subject Matter Code 13.1

Requirement of 0.5 fps

For velocity caps, the approach velocity should not be held to a strict 0.5 fps requirement. What is important in selection of an approach velocity for velocity cap structures is that the fish near the structure detect and respond to the intake flow before they swim through the outer annular opening coarse bars. Once inside, the coarse bars there is an acceleration of flow velocity and a transition in flow vectors as the intake waters move into the vertical-stand-pipe and riser shaft. Typical stand-pipe/riser shaft velocities are on the order of 5-7 fps and the vertical flows are known to be especially lethal to fish near intakes. Generally, 0.5 fps will be greater than existing local currents and therefore be protective of entrapable fish. However, long shore currents or the currents of estuarial rivers may reduce approach velocities below 0.5 fps thereby allowing fish to swim near to or even into a velocity cap structure before detecting the intake's flow. Once through the coarse bars and under the cap, they are subjected to accelerating velocity and vertical current vectors; a deadly combination.

EPA Response

The final rule would allow the use of alternatives to the 0.5 ft/s intake velocity requirements. See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.206.119 for information on entrapment of fish in intake structures.

Comment ID 316bNFR.050.003

Subject Matter Code	9.2
Types of Environmental Impacts Caused by CWIS	

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

Ocean and estuarine intakes can be rendered far less attractive to local fish, diving birds and marine mammals (seals) if they are maintained fouling-free. It would seem to be within the authority of EPA and appropriate for this rule- making, to require some measures at the construction stage and later during operation, that would ensure fouling by sessile invertebrates was minimized. A reduction in fouling marine life will effectively discourage potentially entrapable organisms such as browsing fish (e.g., labrids), diving ducks (i.e., scoter ducks), and marine mammals (i.e., seals attracted to fish schools) from approaching an intake.

EPA Response

See sections VI.B.1 and VI.E.3.a of the Preamble for a discussion of cooling water intake fouling and fouling controls, including biofouling measures.

Comment ID 316bNFR.050.004

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

The proposed differentiation of "littoral zone" or "outside the littoral zone" for ocean intakes will be of little significance for east coast facilities. Due to the extent of the shallow continental shelf on the east coast, the distance required for siting an intake far offshore to be outside the littoral zone, would be prohibitively costly. However, there may be some value to encouraging the placement of ocean intakes reasonably far offshore but in this case, the proposed definition of littoral zone will not work for the Atlantic coast.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.050.005

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

Subject Matter Code 12.0

Best Technology Available-Flow and Volume

While we recognize thermal issues associated with Section 316 of the Water Act are not covered by the proposed 316(b) ruling, there is, nevertheless, a thermal consideration that directly hinges on intake capacity. The volume - withdrawn for once-through circulating water systems is fundamentally tied to a design condenser <delta>T. For a set amount of waste heat, produced as a result of steam cycle operation, the condenser design may be for low volume high <delta>T or high volume low <delta>T .In deciding which choice is better for a given facility, one is faced with the complex problem of evaluating the comparative environmental risks of various CWS potentials for environmental damage. The low volume CWS flow minimizes intake threats (i.e., 316(b)) while it will increase the thermal threat by a high <delta>T (316(a)). The proper factoring of the entire complex of CWS threats, both those controlled by 316(b) and 316(a), is a daunting task indeed, and must involve a suite of environmental specialists, both those with expertise in the biological sciences and those with knowledge of the physical sciences.

The point is, a standard prescribed <delta>T will invariably direct the design CWS flow rate. However, if the discharge design and location can be judged capable of tolerating a higher than standard <delta>T, then the 316(b) threats (i.e., entrainment and entrapment) are diminished by reducing the CWS flow rate.

EPA Response

Thermal discharge obligations under CWA Sec. 316(a) are not affected by today's final rule. While EPA agrees with the commenter that higher temperature discharges can adversely affect the source waterbody, EPA does not believe that a reduction in cooling water intake capacity will necessarily result in a proportional increase in discharge temperature. EPA believes the requirements of 316(a) and 316(b) are not mutually exclusive. Rather, both sections are realistically achievable by industry as a whole.

Today's final rule allows new facilities ample discretion in crafting a suite of technological and design approaches to meet all obligations under the Clean Water Act. For example, adoption of a recirculating cooling system can achieve the mandated reduction in cooling water intake capacity while preventing an unauthorized increase in discharge temperature. Use of combined-cycle technologies, which are common practice today, can reduce the need for cooling water and, by extension, the overall discharge temperature. In short, EPA believes sufficient design and technology options exist for new facilities to comply with Sections 316(a) and (b).

Comment ID 316bNFR.050.006

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

Clearly the proposed rule would steer CWS' towards low volume closed cycle systems. What is not adequately discussed in the document is the possibility that some open cycle (once through) low <delta>T CWS' may have a net negative impact for certain entrainable plankters less than the totally consumptive loss resulting from a closed cycle system. Based on evidence of entrainment survival by certain plankters (e.g., molluscan veligers), the comparatively high volume traversing a once through system may result in a lower total stock mortality than the low volume withdrawn by a closed cycle system. If a CWS is sited in an area where an entrainment tolerant animal is of prime concern (e.g., a clam resource), the analyses that compares total CWS impact, both closed cycle and open cycle, should be completed. In some cases, the non-consumptive high volume system may be better for the resource than a totally consumptive low volume system.

EPA Response

EPA understands the scenario described by the commenter under which the case could be made that once-through cooling may more effectively minimize AEI than a closed cycle system. EPA believes that the two-track technology-based framework described in today's rule provides new facilities with the flexibility to minimize AEI through performance-based standards (Track I) or based on site-specific considerations (Track II). In the case of many new facilities, AEI may be presumed in advance and the Track I performance-based standards option can be selected. If a facility is uncertain about the potential for AEI or deems the potential for AEI to be unlikely based on site-specific conditions or intake structure design features, the facility can choose the Track II option and show through a comprehensive demonstration study that comparable entrainment and impingement minimization will be achieved. Thus, under today's rule facilities may choose to implement Track I performance based standards or conduct site-specific studies under Track II to show comparable minimization of entrainment and impingement.

Comment ID 316bNFR.050.007

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

Subject Matter Code 125.86

Information to Collect

The proposed rule, Section 125.86, provides for the use of existing data (instead of actual field studies) for source water baseline biological characterization. However, there is no prescribed limit on the age of the existing data nor would a firm limit be necessarily desirable. What should be recognized is that some existing data may be inappropriate for use because of either its age or because conditions in the source waters may have undergone significant environmental change, possibly influencing either short-term or long-term, the biotic character of the area

It is possible the drafters of the rule considered this and would expect agency approval of a pre-filed study plan to cover this eventuality. One cannot tell for certain from the document.

EPA Response

Under § 125.86(c)(2)(i)(B), data from previous biological studies performed in the vicinity of the proposed or actual intake may be submitted if the data are no more than 5 years old (so that they reasonably represent existing conditions). It must be demonstrated that such existing data are fully representative of the current conditions in the vicinity of the intake, and documentation must be provided to show that the data were collected by using established and reliable quality assurance procedures.

Comment ID 316bNFR.050.008

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name John I. Nelson

Organization New Hampshire Fish and Game Dept.

The discussion of Adverse environmental impact on page 29 et seq is thought-provoking. Granted, this term is a difficult one to define and may best be handled by the publishing of guidance criteria. In any case, what should be avoided is the assumption that a plankter entrained is necessarily killed. It has been shown that certain types of zooplankters (e.g., molluscan veligers) survive entrainment where moderate <delta>T's and transit times are involved. Along these same lines of reasoning, some impinged macro- invertebrates can be returned from traveling screen wash systems and survive. In fact, systems have been retro fitted to facilitate the safe return of impinged crustaceans.

EPA Response

Please see response to comment 316bNFR.009.001.

While EPA agrees that some species do appear to survive entrainment and impingement, it is also clear from multiple studies that many species exhibit high mortality rates in response to impingement and entrainment events. In the case of entrainment and impingement survival studies, survivorship is highly dependent on the species and life history stage affected. As discussed in section V.B.2.c of the preamble, a summary of entrainment mortality data from five Hudson River power plants indicated that mortality rates can be substantial. With respect to impingement mortality, EPA acknowledges that impingement survival can be high if appropriate technologies are in place. Conversely, impingement survival can be very low seasonally for some species such as bay anchovy and Atlantic menhaden. Today's rule seeks to minimize impingement and entrainment losses for all affected species.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

W. Thomas Hudson

On Behalf Of:

Virginia Chemistry Council

Author ID Number:

316bNFR.051

Comment ID 316bNFR.051.001

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

Subject Matter Code 7.4

Water Withdrawal threshold

The Virginia Chemistry Council strongly supports the inclusion of a threshold for application of the 3l6(b) standards for new facilities. This would avoid applying burdensome procedures to thousands of intake structures which have little or no potential for causing adverse environmental impact.

EPA Response

No response necessary.

Comment ID 316bNFR.051.002

Subject Matter Code EXIST

Existing Facility Rule

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

The New Facilities Rule Must Be Evaluated In The Context Of The Upcoming Proposal Related To Existing Facilities.

Even though the current proposal is aimed at new facilities and new cooling water intake structures, many of the provisions in the new facility proposed rule must be viewed in terms of the upcoming proposal on existing intakes. As EPA is aware, throughout the United States there are a variety of manufacturing facilities and utilities that use cooling water and therefore have some type of cooling water intake structure. While very large intake structures, especially if located in an ecologically sensitive zone, may result in adverse environmental impact, most of the existing intake structures have been in existence for decades, and no evidence has been produced that there is widespread adverse impact to aquatic biota from these intake structures. EPA's goal should be to assure that the resources of the regulatory agencies as well as regulated entities are focused on the type of situations that present significant potential for causing adverse environmental impact and therefore warrant further investigation.

EPA must establish a practical and realistic threshold approach for both the new facility rule and the existing intake rule. This threshold approach would be used to determine which cooling water intake structures would be subject to the requirements of the Section 316(b) regulations.

EPA Response

See response to comment 316bNFR.035.005 and the preamble to the final rule.

Comment ID 316bNFR.051.003

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

EPA Should Consider Design versus Actual Flow as the Basis of the Threshold Cutoff

For new facilities, because there is no actual flow experience and the design flow is readily available, we agree with EPA's proposal to apply the threshold to intake design flow. When EPA develops a threshold for the existing facility rule, though, reliance on design flow would be inappropriate, for several reasons. For one, design flow may not be ascertainable for older facilities, and the facility may actually be withdrawing more water than the intake structure design flow. Most importantly, design flow will often substantially overstate the true impact that the intake structure has on the source water.

Many facilities have actual intake flows far below the intake structure design flow, either because the intake structure was "over-designed or because the facility has substantially reduced its water usage over time. Treating such an intake structure as if it really were withdrawing at a much higher rate and therefore as if it has greater potential to affect the source water would be unrealistic. Moreover, this situation could remove an incentive for further water usage reductions.

Therefore, we recommend that EPA substitute "actual intake flow" for "design intake flow" in the proposed regulatory language for existing structures and should also include a definition of that term. We suggest that "actual intake flow" be defined as "the highest 30-day average intake flow during the last 5 years." This is a number that should be easy for facilities to determine, and it would assure that a longer averaging period is not masking any peak withdrawal periods.

EPA Response

This rule applies to new facilities that use cooling water intake structures. The Phase II and III rules will address existing facilities.

Comment ID 316bNFR.051.004

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Comment deleted. Text included as part of comment 316bNFR.051.003

EPA Response

No Response Necessary.

Comment ID 316bNFR.051.005

Subject Matter Code	7.1

Definition: New Facility

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

Definitions Of New And Existing Facilities Need Clarity

If EPA proceeds with the approach in the proposed standard for new facilities of setting stringent default requirements for location and operation of cooling water intake structures, it will be necessary to develop a different set of requirements for existing facilities. As EPA noted, at 65 Fed. Reg. 49064, there are numerous ways in which existing facilities will be more limited in their ability to comply retroactively with specific new requirements. These include limitations on the location of the intake structure or the percentage of the receiving waters withdrawn through the structure, because the facility's location is fixed, and its manufacturing equipment has already been designed and installed.

Specifically, we maintain that the new facility rule must clearly define the applicability of the proposed rule, so that it only covers a "greenfield" plant or a new, substantially independent plant co-located with an existing plant and requiring a new or expanded intake structure. EPA has based the proposed new facility requirements on the assumption that the owner has the option of choosing the location for the facility to allow him to comply with the intake structure location and operation requirements. EPA should make it clear that the "substantially independent" test is based on whether the facility owner could practicably locate the facility elsewhere.

EPA Response

This rule applies to new facilities. Existing facilities will be addressed under future rulemakings (i.e., Phase II and Phase III).

See response to 316bNFR.030.003.

With regard to defining when a facility is substantially independent under 40 CFR 122.29, EPA does not believe it is feasible to project under what circumstances owners and operators are free to select any location they desire for a new facility. For this reason, EPA takes the facility as it is planned for purposes of determining whether it is a new facility. In the final rule EPA does not believe it is appropriate to define the phrase “substantially independent” as used in 122.29(b)(1)(iii) as facilities that could be practicably located at a separate site. Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether ... processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." EPA does not think it is feasible for the permit authority to judge whether the facility could have been elsewhere for the purpose of determining whether the facility is subject to the new facility rules.

Comment ID 316bNFR.051.006

Subject Matter Code 7.4

Water Withdrawal threshold

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

EPA' s Proposed Threshold Of 2 mgd Is To Low

We strongly support the inclusion of a threshold for application of the 316(b) standards for new facilities, which would avoid applying burdensome procedures to thousands of intake structures with little or no potential for causing adverse environmental impact.

EPA Response

No response necessary.

Comment ID 316bNFR.051.007

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

We believe that the proposed cutoff level of 2 million gallons per day (mgd), however, is too low to accomplish that task. Accordingly we urge EPA to revise this level and set a reasonable threshold for the application on these Section 316 (b) rules.

EPA recognizes that a 2 mgd threshold would still leave almost all of the cooling water flows subject to regulation-99.97 percent in EPA's judgment. 65 Fed. Reg. 49068. If exempting smaller sources has any legitimacy at all, as we (and apparently EPA) believe it does, a cutoff that removes only 0.03% of the intake water flows from the regulatory program is inadequate.

Several of our member's manufacturing facilities have cooling water intakes with flows as high as 144 mgd. These facilities have been in existence for decades with no significant adverse environmental impact. It is especially important in the context of the rule for existing facilities that the threshold and other provisions of the rule be established to prevent the unnecessary burden of retrofitting facilities that have existed for decades and are not causing adverse environmental impact.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

This rule applies to new facilities. The threshold requirements for existing facilities will be established under Phase II and III regulations. The Agency notes that Track I of the new facility rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD. For further discussion of these points, see Sections V and VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.051.008

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

In Determining If An Intake Is Primarily A "Cooling Water Intake" Or A "Process Water Intake" EPA Should Use "Major Use" Rather Than The Arbitrary 25% Value As Currently Proposed.

The Agency's proposed rule defines a cooling water intake structure as the total physical structure and any associated constructed waterways used to withdraw water from a water of the United States, provided that at least 25 percent of the water withdrawn is used for cooling purposes. As noted by EPA the definition wording "....of at least 25 percent of the water withdrawn is used for cooling purposes..." is a change from the 1976 final rule and 1977 draft guidance definition which stated " A facility used the major portion of water drawn through the structure. EPA also states in the proposed rule that "In practice many permitting authorities have interpreted that definition to apply to intake structures if a facility uses more than 50 percent of the water drawn. ..."

The past interpretations have kept the definition of cooling water intake structure simple. The majority use of the intake water will label the use of the intake structure. Accordingly, we suggest that the Agency adopt a threshold that is simple and in keeping with past (i.e., 1976 final rule and 1977 draft guidance) as well as current practices. Therefore we recommend that the Agency use a "major" use standard to determine if an intake in question is a cooling water intake structure. Thus, if the majority (>50%) of the water is used for cooling purposes, it is a cooling water intake structure, if the majority (>50%) of the water is used for process water, it is a process water intake structure.

Additionally, many industrial facilities often preheat process water with energy captured from operations inside the facility. A common way of doing this is to run the water first through a use where heat will be transferred to the water (such as in a steam condenser) and then use it for other for process purposes. Compared to the alternative of discharging the waste heat to the environment in cooling water, this practice conserves both water and energy. Because of the clear environmental advantages of reusing this water and capturing what would be otherwise wasted energy, such waters should be excluded from the definition of cooling water.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to

cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.051.009

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name W. Thomas Hudson

Organization Virginia Chemistry Council

EPA Must Establish a Reasonable Definition of Adverse Environmental Impact

VCC believes that the definition of " adverse environmental impact" (AEI) is critical in terms of this rule as well as the forthcoming proposal on existing cooling water intake structures. Since the Utility industry and EPRI have substantial long-term experience with 316 (b) issues in general, and specifically on an improved definition of AEI, VCC strongly encourages EPA to fully consider the Utility Water Act Group's (UW AG) comments on this topic. We fully endorse the concept of determining fish and aquatic health and vitality based upon fish population - rather than on the possible arbitrary determination of AEI with the impingement or entrainment of one fish.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

The branched intake designs in the proposed rule are representative of one possible technical solution to reducing intake velocity. As this rule addresses new facilities (i.e. facilities that do not yet exist), very little data was available to craft a comprehensive technical solution for every imaginable intake design. EPA therefore used this theoretical example as the basis for costing technical solutions.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

Finally, the record demonstrates that new facilities can be designed with consideration given to the through-screen velocity requirement, and designs can be altered accordingly. Today's rule does not apply to existing facilities, as EPA will address existing facilities fully in Phase II and Phase III rulemakings.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

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316bNFR.052

Comment ID 316bNFR.052.001

Subject Matter Code 10.01

Regulatory Framework Options

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While we commend EPA for its efforts, the Agency has proposed multiple alternative standards for most elements of the Rule, from definitions to the mechanics of its application. See 65 Fed. Reg. 49,060, passim. This approach creates, rather than reduces, complexity, effectively compelling comment on options the Agency may not be seriously considering and multiplying opportunities for disagreement on collateral issues. Rather than offer exhaustive comments, therefore, we have focused on those elements of the proposed Rule that appear to represent EPA's current preferences. If EPA narrows or revises the proposed Rule, as seems inevitable, we hereby request additional opportunity to comment.

EPA Response

EPA has revised the requirements presented in the proposed rule. In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.052.002

Subject Matter Code	9.4
Adverse Environmental Impact	

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Despite the importance of the definition of "adverse environmental impact" to this rulemaking effort, EPA offers no proposed definition, apparently preferring to postpone definition of the term to some future guidance document (issued outside the scope of public debate) or preferring not to issue any definition at all. See 65 Fed. Reg. at 49,074, Preamble § VII (D) ("The Agency also might ultimately decide to publish one of these alternative [definitions] in guidance that supports the final rule. EPA is also considering taking no action regarding the definition of adverse environmental impact."). We question whether such an approach meets EPA's obligations under Appalachian Power Co. v. Train, 566 F .2d 451 (4th Cir. 1977) (critical information not published in federal register is not a validly issued component of regulations), and further suggest it may bypass the informed discussion essential to development of an effective Rule. Cf. Appalachian Power Co. v. Environmental Protection Agency, 208 F.3d 1015 (D.C. Cir. 2000) (setting aside guidance where it had effect of amending the regulation). While we are sensitive to EPA's obligation to meet Court-ordered deadlines for issuance of the Rule and to the difficulty of defining adverse environmental impacts, we cannot support a proposal to create a comprehensive regulatory framework, while omitting an essential term and triggering mechanism.

EPA Response

Please see response to comment 316bNFR.802.013.

EPA is interpreting AEI through notice and comment rulemaking and is publishing our interpretation as part of today's preamble. Because AEI is not a regulatory requirement, it is not necessary that it be placed in the regulation.

Comment ID 316bNFR.052.003

Subject Matter Code EXIST

Existing Facility Rule

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The Preamble creates an impermissible level of uncertainty about the application and effect of this Rule on existing, as opposed to new, facilities. While EPA appropriately recognizes that this Rule does not apply to existing facilities, see 65 Fed. Reg. at 49,064, Preamble § II(C), EPA inexplicably adds that "the Agency will address the extent to which the final new facility regulation and preamble should serve as guidance for developing § 3l6(b) requirements for existing facilities prior to the promulgation of the § 316(b) regulations for existing facilities." See 65 Fed. Reg. at 49,064, Preamble § II(C). This latter statement fosters the impression that EPA may use this Rule as guidance for implementing § 316(b) requirements for existing facilities in the interim period between the final rule for new facilities and the final rule for existing facilities, a result which effectively obviates public comment on any rule for existing facilities. As such, we respectfully submit that EPA independently must draft and promulgate regulations for existing facilities, neither applying the proposed Rule as guidance, nor as an "interim" measure, the scope of which is unclear and likely illegal. On a related note, we question whether existing, as opposed to new, facilities are appropriately subject to § 316(b), and look forward to EPA's proposed rule for existing facilities, which we expect to address this unresolved question.

EPA Response

See response to comment no. 316bNFR.024.003.

Comment ID 316bNFR.052.004

Subject Matter Code	9.4
Adverse Environmental Impact	

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Defining AEIs.

To the extent the Agency addresses AEIs within the context of water resources, we support EPA's focus on an ecosystem-level definition of AEIs as mandated by CW A, § 316(b), as well as consistent with established industry and Agency practice. In particular and for the reasons discussed below, we respectfully submit that the proper measure of AEIs under § 3l6(b) for new facilities are sustained adverse impacts to an aquatic ecosystem, a macrocosmic perspective.

A macrocosmic definition of AEIs comports with EPA' s jurisdiction under the CWA. The CWA directs EPA to regulate "navigable waters" or waters of the United States, see 33 U.S.C. § 1362(7), including by limiting "pollution," defined as "man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water." See 33 U.S.C. § 1362(19). Water and its "biological ...integrity," not individual fish, shellfish or wildlife, are the focus of the CWA. The term "integrity," while undefined, contemplates a macrocosmic perspective, see, e.g., American Heritage College Dictionary ("...2. The state of being unimpaired; soundness. 3. The quality or condition of being whole or undivided; completeness."). The macrocosmic interpretation also avoids confusion with other federal laws which do target individuals. See, e.g., Endangered Species Act, 16 U.S.C. § 1531, et seq. (the "ESA ")<FN 1>

Further, where the CWA targets aquatic life, it customarily does so on an ecosystem- or a population-level. See, e.g., 33 U.S.C. § 1312(a) (promoting a "balanced population of shellfish fish and wildlife") (emphasis supplied); 33 U.S.C. § 1330(a)(2)(I) (same, within the context of estuary management); 40 C.F.R. § 230.1(c) (proscribing significant adverse impacts to "aquatic ecosystems, " under CWA § 404) (emphasis supplied). Indeed, we have identified no CWA provision specifically authorizing EPA ' s management of individual fish (or anything analogous to entrainment-mortality), absent some level of impact to the population or ecosystem at issue. Thus, a definition of AEls which targets individual mortality is inconsistent with the general scope of the CWA.

A macrocosmic view also comports with the language, purpose, and intent of § 316(b) itself. Section 316(b) falls within § 316, which is entitled "Regulation of Thermal Discharges."<FN 2> Under the § 316(a) variance procedure, EPA's focus is on the population-level impacts. Relative to § 316(a), EPA has rejected, as "unreasonable" and "costly," a needlessly stringent measurement of AEIs; e.g., against an aquatic ecosystem existing prior to human habitation or absent pollution, such that no impact could be tolerated. See Hearings before the Subcommittee on Environmental Pollution, 97th Congress, Second Session, Serial No. 97-h58 (July 21,22,28 and 29, 1982), p. 113. While we recognize that language differences do exist between § 316(a) and (b), we see no basis for EPA to depart from its sensible approach relative to § 316(a), particularly given that it is the framework in which § 316(b) exists (in the statute).

Finally, we support the Agency' s recognition that the mortality of a single organism cannot reasonably constitute AEIs. See 65 Fed. Reg. 49,074, Preamble § VII (D).<FN 3> We further note that it is

inappropriate and impracticable to define AEIs on an individual level, without resolving the numerous questions, including the following:

* How will EPA account for fish mortality in other circumstances; e.g., commercial or recreational fishing. See 65 Fed. Reg. at 49,104, Preamble § X (B) (discussing benefit of proposed rule in terms of commercial and recreational fishing).

* Whether the weight of credible scientific evidence indicates that larvae mortality (through entrainment or otherwise) is correlated to a reduction in the number of adults of the species and, therefore, the health of the population or ecosystem.<FN 4>

* Whether the weight of credible scientific evidence indicates that larvae mortality necessarily results from entrainment.

Assuming that EPA has selected the ecosystem- or population-level approach, EPA has submitted three alternative definitions, summarized as follows:

* Entrainment of organisms of sufficient magnitude to a have detrimental impact on the populations of affected species or organisms, which EPA maintains is consistent with its 1977 Guidance. See 65 Fed. Reg. at 49,074, Preamble at § VII (D).

* Defined by the Director on a waterbody-specific basis, and reflecting projected CWIS impacts on that aquatic community, based on "reference sites." See 65 Fed, Reg. at 49,075, Preamble at § VII (D).

* An undefined alternate definition that takes into account the protection of endangered species, socially, recreationally, and commercially important species, and "community integrity including structure and function." See 65 Fed. Reg. at 49,075, Preamble § VII (D).

While doubtless each of the above has it merits, each is incomplete. Accordingly, we recommend a definition which captures the CWA purpose of protecting ecosystems, including balanced fisheries resources, consistent with the first definition. To that end, we suggest any ecosystem-level analysis for waterbodies (where limited scientific information is available) allow consideration of "reference sites." We note, however, that the existence of endangered, recreationally or commercially important species is a likely component of any siting process associated with new facilities, and need not necessarily be considered in any § 316-specific analysis.

Footnotes

1 However, even the ESA's remedial focus on individuals is tied directly to the health of the population or species. Individual members of endangered and threatened species are protected by law, in part because the condition of the population is such that the "taking" of an individual may threaten the viability of that population or the species. See 16 U.S.C. §§ 1531(b), (c)(I) & 1532 (3).

2 EPA may regulate point and non-point sources, the former under the National Pollutant Elimination Discharge System ("NPDES") permits, subject to CW A, § 402, the NPDES permitting program and its state analogs. See 33 U.S.C. § 1362(14) ("point sources"); 33 U.S.C. § 1288 ("non-point sources"). CWlSs are not "point sources" subject to regulation under § 402, even though the subject facilities may otherwise be point sources. See National Wildlife Federation v. Consumers Power Co., 862 F.2d 580 (6th Cir. 1988) (recognizing and accepting EPA's position that entrained eggs and larvae circulated through

turbines is not the discharge of pollutants from a point source, subject to regulation under § 402).

3 Accordingly, we believe EPA rightly has questioned the purported interpretation of the term AEI by the New York State Department of Environmental Conservation (i.e., as the entrainment or impingement of a single organism). See 65 Fed. Reg. at 49,074-075, Preamble § VII (D).

4 In its mid-1970's rule-making effort, when EPA advocated consideration of larvae mortality as an appropriate measure of AEI, it did so in the absence of a quarter century of scientific evidence regarding entrainment and ecosystems. 41 Fed. Reg. at 17,388. As such, we expect EPA's prior determination to reflect this data, i.e., by a move away from a purely numerical mortality determination.

EPA Response

EPA does not agree that a definition of entrainment mortality is inconsistent with the CWA (see responses to comments 316bNFR.068.007 and 316bNFR.068.008.In the technology-based program under sections 301, 304, and 306 of the CWA, EPA establishes controls on discharges of pollutants without having to demonstrate effects of the discharges on the receiving waters. Weyerhaeuser Co. v. Costle, 590 F.2d 1011 (D.C. Cir. 1978).

Please see responses to comments 316bNFR.507.004, 316bNFR.501.015, and 316bNFR.014.013.

EPA does not agree that the CWA compels EPA to link 316(b) adverse environmental impact to the objectives of 316(a) of the Act (i.e., balanced indigenous population). EPA believes that the choice by Congress of different terms in section 316(b) versus 316(a) can be presumed to be intentional and purposeful. Bates v. U.S., 522 U.S. 23 (1997). Please see section VI.B.2.a. of the preamble for the final rule.

Comment ID 316bNFR.052.005

Subject Matter Code	9.4
Adverse Environmental Impact	

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AEI & BTA.

The CWA contemplates the existence of AEIs as a trigger to any BTA determination. This is the express and only logical reading of CWA, § 316(b), which requires, "that the location, design, construction and capacity of cooling water intake structures reflect the best available technology for minimizing adverse environmental impact," not simply that BTA be implemented at every facility, irrespective of its AEIs. See 33 U.S.C. § 1 326(b). Absent impacts, a BTA assessment would be a purely theoretical but costly exercise, without any corresponding environmental benefit.

EPA Response

Please see response to comment 316bNFR.014.009.

Comment ID 316bNFR.052.006

Subject Matter Code 13.1

Requirement of 0.5 fps

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Intake Velocity.

The proposed Rule mandates a maximum intake velocity of 0.5 ft/s, based on various studies performed in the early 1970s, plus an arbitrary safety factor of two. See 65 Fed. Reg. at 49,087-088, Preamble at § VIII (A)(4). We question whether there is credible scientific support for such a limitation, and request that EPA detail its rationale for selecting this limitation and eliminating other possible limitations.

EPA Response

See response to comment 316bNFR.014.018.

Comment ID 316bNFR.052.007

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Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Non-aquatic Impacts.

EPA also has requested comment on whether it should take into account the non-aquatic impacts of CWISs, specifically the impacts of cooling towers themselves. While we recognize that there is no express statutory support in § 316(b) for limiting consideration to aquatic impacts, see 33 U.S.C. § 1326(b), and further believe that the analysis of such impacts can be appropriate, we do register our concern about the appropriateness of a discussion of non-aquatic impacts which relate to equipment not properly considered CWISs; e.g., cooling towers.

EPA Response

See response to comment 316bNFR.014.019.

Alternatives.
The CWA has identified § 316(b) as a "standard of performance." The CWA defines such standards, at least with respect to the discharge of pollutants, to include "best available demonstrated control technology, processes, operating methods, or other alternatives...." See 33 U.S.C. § 1316(a)(1). There is a basis, therefore, for considering alternatives within the standards of performance for § 316(b).

EPA has long accepted alternatives to BT A as consistent with sound environmental management practices. In 1982, EPA supported clarification of § 316(b), see Hearings before the Subcommittee on Environmental Pollution, 97th Congress, Second Session, Serial No. 97-h58 (July 21,22,28 and 29, 1982), p. 113, in which EPA proposed BTA alternatives, such as fish hatcheries. As tellingly, BTA alternatives, have been accepted as a matter of practice.

As one such alternative, EPA should evaluate a system allowing facilities to allocate credits for reduced impacts from intake structures; e.g., below design flow levels. As an incentive for such flow reductions, these credits should be marketable either between plants on the same water body or between plants on waterbodies with similar representative species or fish communities. This alternative to BTA preserves a facility's flexibility to schedule flow reductions or technical upgrades consistent with system reliability requirements or operational plans, while ensuring adequate levels of resource protection. This alternative, like other tradeable permit schemes, also allows regulated facilities to work collectively and cooperatively to find the most cost-effective solution to accomplishing flow reduction objectives. Requiring BTA of each facility is much more inefficient from an economic perspective, particularly if (as discussed below) EPA persists in eliminating the relationship between the cost of BTA and the environmental benefit to be gained by its use.

EPA Response

See response to 316bNFR.028.033.
EPA did not adopt the trading approach suggested by the commenter in this rule, in part because EPA believes that the two-track approach developed in this rule is easier to implement for new facilities, that all new facilities can technically and economically meet the requirements of the rule, and because EPA did not propose this approach for new facilities. EPA intends to consider this approach in the existing facilities rules.

Track II in the final rule provides substantial flexibility for applicants to assess the most cost-efficient means of compliance. Beyond this flexibility and the alternative requirement provision described, other cost-based provisions have not been deemed warranted for new facilities. Given the focus of section 316(b) on promoting use of best technology available, EPA has included provisions addressing trading reduced impact credits in the final rule. EPA may consider such an alternative as it develops Phase II and III regulations.

Comment ID 316bNFR.052.009

Subject Matter Code	18.1
Elimination of "Wholly Disproportionate" Cost Test	

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THE ROLE OF COST IN DETERMINING BTA

Congress and the federal courts have long understood that cost plays a role in determining BTA for any given facility. See, e.g., Seacoast Anti-Pollution League v. Costle, 597 F .2d 306, 311 (1st Cir. 1979) (recognizing that "the legislative history clearly makes cost an acceptable consideration in determining whether the intake design 'reflect(s) the best technology available"). Consistent with this applicable caselaw, EPA has in practice recognized that, where the cost of compliance is "wholly disproportionate" to the environmental benefit achieved, BTA is not required. See, e.g., id. In the proposed Rule, EPA departs from this comparison of cost and environmental benefits under § 316(b), an approach inconsistent with established law, including caselaw developed with respect to then-proposed (or new) facilities. See, e.g., Seacoast Anti- Pollution League v. Costle, 597 F.2d 306,311 (1st Cir. 1979). We therefore respectfully cannot support EPA ' s changed position absent some reconciliation with this existing law and Congressional intent.

EPA Response

EPA disagrees with the commenter's claim that the "wholly disproportionate" test is required for BTA determination. For technology based rules such as the final section 316(b) New Facility Rule, EPA believes that the affordability test is most appropriate for BTA determination. For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. EPA determined economic practicability by using the most current data available in considering the cost of the rule as compared with the revenue of a facility, as well as the cost compared to the overall construction costs for a new facility (for electric generators only). The cost ratio approach used by EPA for the final rule is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA, to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA.

For more detail please see response to comment 316bNFR.206.014 in comment category 10.11 and the preamble to the final rule.

Comment ID 316bNFR.052.010

Subject Matter Code	24.1
EEA - Baseline and Projected Costs	

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We question EPA's conclusion that the total annualized cost of compliance from the proposed Rule is $12.1 million, see 65 Fed. Reg. 49,101, Preamble § X (A), which EPA estimates as ranging from 0.1 to 4.2% of annual revenues for steam electric generating plants. See 65 Fed. Reg. 49,095. EPA determined that about forty (40) electricity generating facilities subject to the Rule would likely be built between 2001 and 2020. See 65 Fed. Reg. 49,070, Preamble § VI (B). Of these, EPA estimated thirty-three (33) "already plan to build a cooling tower. " See id. Therefore, for these facilities, EPA assigned no cost due to the proposed Rule. See id. (For the remaining seven, "total annualized costs... are estimated to be $6.4 million, using a seven percent discount rate and a 30-year analysis period." 65 Fed. Reg. at 49,102, Preamble § X (A)(l).) This conclusion presumes the very result the Rule would achieve, and therefore understates cost. We therefore respectfully request that EPA reconsider its calculation of the costs of compliance with the proposed Rule.

EPA Response

The commenter questions EPA's estimate that 33 of 40 electricity generating facilities subject to the Rule already plan to build a cooling tower in the baseline. Since proposal, EPA updated its analysis with newer data sources. The analysis for the final rule showed that 83 electricity generating facilities would be subject to the Rule. Of these, 72 are estimated to build a cooling tower in the baseline. EPA believes that these estimates of baseline technologies are reasonable. EPA's cost analysis is based on the best information that was available at the time. Baseline technologies for coal facilities are based on the section 316(b) Industry Survey of existing facilities. This information was provided by the regulated industry. For combined-cycle facilities, the baseline technologies are based on combined-cycle facilities proposed for construction over the next several years. The baseline technology information was provided by state permitting authorities and is largely based on permit application. EPA believes that these data sources provide the best information on baseline technologies employed in the recent past and proposed for the near future.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

James R. May

On Behalf Of:

Mid-Atlantic Environmental Law Center
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Author ID Number:

316bNFR.053

Comment ID 316bNFR.053.001

Subject Matter Code	10.01
	Regulatory Framework Options

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While the Commentators commend EPA for proposing rules to address the profound environmental impacts of Intake Structures, they believe that the Proposed Rules are not in accordance with the CWA and that EPA should instead propose national rules that reflect BTA, that is, "dry cooling," for all new intake structures, regardless of location, design, construction or capacity. Further, we believe that consideration of "costs" in section 316(b) contravenes the Clean Water Act. Assuming costs are relevant, such consideration must account for the benefits of BTA, and then must be evaluated using a test that evaluates the marginal cost increase to the ratepayer of having BTA.

EPA Response

For the reasons discussed in Section V.C of today's rule EPA is not adopting dry cooling as the BTA for minimizing adverse environmental impact. See response to comment 316bNFR.006.001.

EPA disagrees that it may not consider costs in determining 316(b) requirements. See response to comment 316bNFR.206.014. EPA believes that it is reasonable to determine economic practicability in terms of effects of the rule on the industry as a whole. This is how EPA determines BAT and NSPS. EPA also calculated the effects of the rule on ratepayers. See the Economic Analysis. Although section 316(b) does not explicitly State that costs must be considered in determining appropriate cooling water intake structure controls, EPA has long recognized that there should be some reasonable relationship between the cost of cooling water intake structure control technology and the environmental benefits associated with its use. As the preamble to the 1976 final rule implementing section 316(b) stated, neither the statute nor the legislative history requires a formal or informal cost-benefit assessment. 41 FR 17387 (April 26, 1976). The 1976 preamble also noted that the legislative history of section 316(b) indicates that the term "best technology available" should be interpreted as "best technology available commercially at an economically practicable cost." This position reflects congressional concern that the application of best technology available should not impose an impracticable and unbearable economic burden. Therefore, EPA believes that a formal cost test is appropriate in determining "best technology available commercially at an economically practicable cost. (See Section VIII.C of the proposed rule).

Comment ID 316bNFR.053.002

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Subject Matter Code 2.3

Legal/Regulatory History

BACKGROUND TO REGULATING THE ADVERSE ENVIRONMENTAL IMPACT OF INTAKE STRUCTURES

A pernicious yet often overlooked byproduct of electricity production is the annual destruction of trillions of valuable aquatic organisms. Facilities that produce power ("powerplants") create enormous amounts of excess heat waste. To work efficiently, powerplants, like workhorses on a hot day, need to "drink" an enormous amount of water to keep themselves cool and work efficiently. The purveyor of this continuously refreshing pause, called "cooling water," serves as a thermal transfer vehicle to whisk away unneeded heat from a powerplant's condenser system. The cooling water then becomes a waste product of the electricity production process and must be discarded.

Unfortunately, the donors of the cooling water ("source waterbodies") also serve crucial biological purposes: as habitat, nursery, and guardian over a fragile amalgam of aquatic life, including fish, fish fry, fish eggs, crustaceans, marine mammals and plankter. After exploiting the cooling water, powerplants abandon it -- albeit abused and scarcely resembling its former vigorous and life-supporting state -- at the doorstep of the source waterbody. <FN 9>

Congress addressed the previously-ignored effects of intake structures in 1972. Following more than five years of investigation, Congress specifically addressed the impacts of cooling water use by adding section 316 to the Clean Water Act (also referred to herein as the "CWA").<FN 10> In particular, section 316(b) of the CWA addresses the adverse impacts caused by the withdrawal of cooling water. In fewer than twenty words, referring to "design," "location," construction," "capacity," "reflect," "best technology available," "minimizing" and "adverse environmental impact," section 316(b) contains numerous, important operative terms.

The Proposed Rule represents United States Environmental Protection Agency's ("EPA ") latest attempt to impose national regulations to address the impacts of intake structures. Unfortunately, EPA has retreated from its responsibility to promulgate regulations which would give section 3l6(b) effect. In the absence of regulations, some have interpreted section 316(b) strictly to require technological means of compliance, such as dry-cooling, closed-cycle cooling towers, flow management techniques, improved screening systems, behavioral devices and the like. Others have argued that the costs of compliance with section 3l6(b) must not be wholly disproportionate to the environmental benefits conferred by the technology. This has resulted in a dearth of activity to modify or convert, i.e., to ("retrofit") existing Intake Structures to ensure compliance with section 3l6(b). Instead, the difficulties of compliance with and enforcement of section 316(b)'s inscrutable demands, utilities have urged agencies to allow them to pursue non- technological "mitigative" means of complying with section 316(b) known as "mitigation projects" and implementing agencies have been all too quick to oblige. Such mitigation projects include wetlands enhancement and restoration, removal of fish impediments, installation of fish hatcheries, and use of fish restocking programs. Mitigation projects putatively

replace damaged and destroyed fish and aquatic organisms, provide better habitats, venues, and food sources for surviving organisms.

Footnotes

9 See general IX, U .S. ENVIRONMENTAL PROTECTION AGENCY, PRELIMINARY REGULA TORY DEVELOPMENT, SECTION 316(B) OF THE CLEAN WATER ACT, BACKGROUND PAPER NUMBER 2: COOLING W ATER USE FOR SELECTED U.S. INDUSTRIES AND SUMMARY OF SELECTEOEPA REGIONAL AND STATE SECTION 316(8) ACTIVITIES 2-3 (1993) ["1993 BACKGROUND PAPER No.2"].

10 Federal Water Pollution Control Act, 33 U.S.C. § 1351 ~, commonly referred to as the "Clean Water Act" or "CWA".

EPA Response

This excerpt from the comments submitted by the commenter does not contain a particular suggestion regarding how the final rule should be framed, but is merely the commenter's view of the history of section 316(b) of the Clean Water Act. The regulatory history of section 316(b) and legal basis for the final rule are presented in the preambles to the proposed and final rules.

Comment ID 316bNFR.053.003

Subject Matter Code	9.3
Documentation of I & E Impacts	

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One of the most bedeviling machinations of this enterprise is its incomparable impact on fishing interests ("fishers"). Indeed, domestic fish populations have declined dramatically over the last 25 years.<FN 11> Losses have been particularly alarming along the Atlantic Coast.<FN 12> Atlantic fisheries have experienced drops of about 25 percent in fish catches over the last twenty years.<FN 13> The northwest, northeast, westcentral, eastcentral, southwest and southeastern Atlantic fisheries have recently experienced reductions of 42, 16, 36, 20, 11, and 53 percent respectively, amounting to a net reduction of some five million tons annually.<FN 14> Total net reductions of the most desirable commercial and recreational fish types in Atlantic fisheries over the last few decades are about 58 percent, or about 29.71 million tons per year. <FN 15>

Even still, some fish types are more profoundly burdened than others. The Atlantic States Marine Fisheries Commission has estimated that combined recreational and commercial fish landings of previously hearty and economically important weakfish (also known as "sea trout") have declined from about 80 million pounds in 1980 <FN 16> to just under 10 million pounds in 1990.<FN 17> This represents an overall decline in weakfish populations for Atlantic fisheries of almost 75 percent since 1980.<FN 18> Moreover, catches of four popular commercial fish (Atlantic cod, Cap hake, haddock, and silver hake) have dropped from 5 million tons in 1970 to 2.6 million tons in 1989.<FN 19> More current findings suggest that reductions of these species are much greater.<FN 20>

No doubt these declines are somewhat due to overfishing;<FN 21> yet the impacts of Intake Structures have not made agencies implementing section 316(b) any more solicitous. To the contrary, the dramatic decline of certain fish populations has led to rather incongruous and puzzling results. For example, the New Jersey Department of Environmental Protection still allows one of the nation's largest utility users of cooling water to operate largely unabated, causing, among other things, the foregone loss of an estimated 11 million pounds of weakfish annually.<FN 22> The inherent inequity of this situation for dispossessed commercial and recreational fishing interests is not difficult to grasp. Indeed, virtually every state along the Atlantic Coast imposes permit and licensing, gear restriction, and minimum size limits on commercial fishers, and size limitations on recreational fishers.<FN 23> Unfortunately, however, although states continue to point their cross hairs at commercial/recreational fishers, the states, in conjunction with EPA, allow cooling water withdrawal by utilities to exact a devastating toll on affected fisheries with little or no regulatory consequence.

Footnotes

11 For recent discussions commentary regarding the alarming loss of the nation's fisheries, see generally, Peter Weber, Net Loss: Fish, Jobs, and the Marine Environment, (Worldwatch Paper No.120, July, 1994); Peter Weber, Abandoned Seas: Reversing the Decline of the Oceans (Worldwatch Paper No.116, November, 1993); and Dick Russell, "Fishing Down the Food Chain," in The Amicus Journal (Natural Resources Defense Counsel, Fall 1995).

12 See generally, Atlantic States Marine Fisheries Commission, Special Report No.33, "1994 Annual Review of Interstate Fishery Management Plans" (ASMFC, October, 1994).

13 Net Loss, at 14

14 Net Loss, at 14.

15 Net Loss, at 15.

16 Atlantic States Fisheries Commission," An Assessment of the Status of the Atlantic Weak Fish Stock, 1992- 1988" (Special Report No.21, August 1991).

17 Atlantic States Marine Fisheries Commission, "Weakfish Fishery Management Plan Amendment No.1" (Fisheries Management Report No.20, March 1992).

18 Id. at 8.

19 Abandoned Seas, at 32.

20 Pers. Comm. with Dr. Ian Fletcher, September 25, 1995.

21 Id.

22 See Part III.D.6. of The Quick and the Dead.

23 Atlantic States Marine Fisheries Commission, "Weakfish Assessment" (August 1991) at Table 1.

EPA Response

EPA agrees with the commenter that cooling water intake structures do pose a threat to some fishery stocks, that they cause a stress on fisheries, and this rule is seeking to minimize that threat. It is EPA's position that cooling water intakes are one of the factors, among many, contributing to the decline in commercial and recreational fish stocks and also notes that the NMFS has documented in several fishery management plans that cooling water intake structures adversely affect fish stocks.

The Agency stresses that it is addressing the adverse environmental impact associated with cooling water intake structures through today's rule making. Please see Response to Comment 316bNFR.056.005 and section VI.B of the preamble for additional discussion of issues raised in this comment.

Comment ID 316bNFR.053.004

Subject Matter Code	2.3
	Legal/Regulatory History

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Organization Mid-Atlantic Environmental Law Center & Widener University Environmental Law Center

Consistency in agency implementation of Section 316(b) over the last twenty-five years has not been a hallmark. State agencies and EPA often either give their unalloyed blessings to cooling water use, or are otherwise reduced to enforcement by supplication.

Yet all hope is not lost. Given equal amounts principle and calculation, provides the CWA agencies with the tools for effective and commonsensical application of section 316(b).

This is not EPA's first try at establishing intake structure rules. On April 16, 1976, EPA published final rulemaking governing section 316(b) for incorporation at 40 C.F.R. Part 402, entitled "Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact" ("1976 Regulations").<FN 24> EPA first made clear that the 1976 Regulations applied to Intake Structures for any point source for which EPA had established effluent limitations including new or existing powerplants and industrial facilities. <FN 25> EPA published the rule with the goal of satisfying the requirements of section 316(b).<FN 26> However, in 1977 fifty-eight electric companies challenged the rule on the basis that EPA failed to comply with the Administrative Procedure Act in promulgating the rule. Agreeing with the electric companies, the United States Court of Appeals for the Fourth Circuit remanded the rule.<FN 27> Since that decision, EPA has not promulgated another rule. Rather, decisions pursuant to section 316(b) "have been made on a case-by- case, site-specific basis,"<FN 28> although the Proposed Rule aims to change this. <FN 29>

To help regulators charged with implementing section 316(b), EPA published procedural guidance in 1977. <FN 30> Based on that guidance, the primary test used to determine if a certain technology must be employed at a facility to meet the requirements of CWA §316(b) is to balance the cost of the technology with the environmental benefit to be gained.<FN 31> When it is determined that a facility's cooling water intake structures may result in adverse environmental impact and that other practicable technologies exist that could minimize the adverse environmental impact, the inquiry that EPA and states have made is whether the cost of the technology is "wholly disproportionate" to the environmental benefit that would be gained if the technology were used.<FN 32> In short, in these cases, agencies have en grafted upon the section compliance with BTA when its costs were not "wholly disproportionate" to environmental benefits.<FN 33> The Proposed Rule abandons this approach.

Footnotes

24 41 Fed. Reg. 17387 (April 26, 1976) ("1976 Regulations"). Section 316(b) would have found its administrative twin at 40 C.F.R. § 401.14.

25 40 C.F.R. § 402.10.

26 41 Fed. Reg. 17387 (1976)

27 Appalachian Power Co. v. Train, 566 F.2d 451 (41h Cir. 1977)

28 In re Matter of an Application for a State Pollutant Discharge Elimination System (SPDES) Permit Pursuant to Environmental Conservation Law (ECL) Article 17 and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6NYCRR) Parts 750 et seq. by Athens Generating Company, LP, Applicant, Decision No.4-1922-00055100001 (SPDES No.: NY-0261009), 2000 N. Y. ENV LEXIS 49, *16 (June 2, 2000), (hereinafter Athens 1).

29 On October 10, 1995 the United States District Court for the Southern District of New York approved a consent decree between the EPA and a group of plaintiffs seeking promulgation of a § 316(b) rule. See Cronin v. Browner, 898 F. Supp.1052 (S.D.N.Y. 1995). Under the consent decree, EPA must take final action with regard to the rule for new structures no later than August 13, 2001. Cronin v. Browner, 90 F. Supp. 2d 364, 367 (S.D.N.Y. March 27, 2000).

30 See Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500 (U.S. EPA, 1977).

31 Athens I, supra, at *18

32 Id.

33 See In the Matter of Public Service Company of New Hampshire, 10 MRC 1257 (June 10, 1977); In re Florida Power Corp., Crystal River Power Plant Units 1,2, &3: NPDES Permit No. FL0000159 (Sept. 1, 1988); Athens I at *18.

EPA Response

This excerpt from the comments submitted by the commenter does not contain a particular suggestion regarding how the final rule should be framed, but is merely the commenter's view of the history of section 316(b) of the Clean Water Act. The regulatory history of section 316(b) and legal basis for the final rule are presented in the preambles to the proposed and final rules.

Comment ID 316bNFR.053.005

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

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Section 316(b) provides that those who have permitted discharges of cooling water must ensure that "the location, design, construction and capacity of cooling water intake structures reflect the best technology available ["BTA"] for minimizing adverse environmental impact."<FN 34> 33 U.S.C. § 1316(b)(emphasis added). The Proposed Rule, however, excludes its applicability to structures that withdraw less than 2 MGD. (Part V). As discussed below, we believe that this cut-off is arbitrary, and would exclude structures having adverse effects from the requirements of § 316(b). Instead, we think the rule should require BTA in accord with EPA 's "alternative," to define adverse environmental impact, as it has since the inception of this program, as "any impingement or entrainment of aquatic organisms." (Part VII.D.)

Footnotes

34 33 U.S.C. 1326(b). Section 316(b) provides in full:
Any standard established pursuant to section [301] of this title or section [306] of this title and applicable to a point source shall require that the location, design, construction and capacity of cooling water intake structi1res reflect the best technology available for minimizing adverse environmental impact. See, CWA § 316(b). (Hereafter, all statutory references will be made to Clean Water Act and not the United States Code.)

EPA Response

Those facilities that do not meet the withdrawal threshold requirements for cooling water purposes described under today's rule must meet requirements determined on a case-by-case, best professional judgment basis. (Please see 125.80(c) of today's rule.)

Also, please see response to comment 316bNFR.029.013 for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.053.006

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Subject Matter Code 2.2

Obligation Under 316(b)

On October 18, 1972, Congress enacted the Clean Water Act ("CWA ").<FN 35> Section 301 of the CWA ordered EPA to establish effluent limitations for existing point sources by July 1, 1977. <FN 36> Section 301 also states the general rule of the Clean Water Act that, absent a permit, "the discharge of any pollutant by any person shall be unlawful."<FN 37> Section 306 requires the Administrator of EPA to establish standards of performance<FN 38> for new sources by February 18, 1974,<FN 39> i.e., sources whose construction are commenced after publication of proposed regulations prescribing a standard of performance applicable to such sources. <FN 40> Section 316(b) requires that any such standard established pursuant either to section 301 or section 306 shall "require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact."<FN 41> Furthermore, sections 301 and 402 prohibit the operation of a point source in violation of implementing regulations. <FN 42>Thus, the requirements of section 316(b) must be fulfilled by facilities which have both a discharge of a pollutant from a point source (e.g., heat) <FN 43> and a Intake Structure. <FN 44>

Additionally, it appears as though section 316(b) applies equally to both new and existing facilities. Section 316(b) states that its BTA requirements must be fulfilled when there is "any standard" established pursuant to either section 301 or section 306. Section 301 requires EPA to develop effluent limitations which govern existing sources;<FN 45> therefore, section 316(b) applies to existing sources for which there is an effluent limitation. Section 306 requires EPA to promulgate standards of performance for new sources <FN 46> and specifically requires that such standards be set for steam electric powerplants.<FN 47> Thus, section 316(b) applies to "new" steam electric powerplants as well. Courts have agreed with this interpretation. For example, in Central Hudson Gas and Electric Corp. EPA General Counsel determined that all powerplants, whether new or existing, which have both cooling water intake structures and point sources of discharge, are subject to the provisions and requirements of section 316(b). <FN 48>

Moreover, the CWA requires EPA or states issuing NPDES permits to insure that compliance with section 316(b) falls within the ambit of the section 402 permitting process. To be sure, the Seventh Circuit has held that the appropriate permitting agency is "implicitly require [d] ...to insure compliance with section 3l6(b) as one of the [NPDES] permit conditions"<FN 49> and that the requirements of section 316 "are to be implemented through standards established pursuant to sections 301 and 306." <FN 50>

Further, courts have found that permit issuing agencies clearly have authority to apply section 316(b). For instance, in Virginia Electric and Power Company v. Costle <FN 51>, the Fourth Circuit Court of Appeals affirmed a district court's dismissal of Virginia Electric and Power Company's petition for review of section 316(b) conditions for want of subject matter jurisdiction.<FN 52> The Fourth Circuit turned to legislative history and tenets of statutory interpretation to lend support to its ruling that EPA may impose 316(b) conditions as part of NPDES permits.<FN 53> The Court construed section

316(b) conditions to be within the meaning of the term "other limitations" as provided by section 509(B)(1)(e) of the CWA, and therefore subject to review only in the Court of Appeals. <FN 54>

In July 1973, nine months after Congress passed the CWA into law, EPA published a "Development Document" <FN 55> addressing the requirements of section 316(b). Since the steam electric power industry utilizes the greatest volume of cooling water, EPA prepared the Development Document specifically with powerplants in mind.

On August 22, 1973, EPA published a notice of rulemaking to establish effluent limitations for existing sources (including powerplants) and standards of performance for new sources (also including powerplants) pursuant to sections 301, 306, and 316(b), of the CWA. <FN 56>

On December 13, 1973, EPA issued proposed regulations intended to implement section 316(b), entitled "Cooling Water Intake Structures: Proposal Regarding Minimizing Adverse Environmental Impact" ("1973 Proposed Regulations").<FN 57> The 1973 Proposed Regulations were to be incorporated at 40 C.F.R. Part 402.<FN 58> EPA stated that new Part 402 was intended "to provide a framework for the case by case determination of the Best Technology Available for minimizing adverse environmental impact resulting from the location, design, construction, and operation of cooling water intake structures." <FN 59> EPA also proffered that the regulations were to be applied on a "case-by- case basis" and were "intended to serve as outline for the factors to be considered, and the data required, in order to arrive at an environmentally sound decision concerning cooling water intake structure, location, design, construction, and operation [sic]." <FN 60> Moreover, EPA noted any applicable BTA would be dependent upon multiple factors, not the least of which involved the control of the number and types of organisms which interacted "externally" (referring to impingement) and "internally (referring to entrainment) with a relevant Intake Structure." <FN 61> In addition, even though the 1973 Proposed Regulations were not intended to be outcome-determinative, EPA remarked that a "certain degree of national uniformity can be prescribed relative to the factors that must be considered." <FN 62> EPA, however, rejected the use of a performance standard as a means of complying with section 316(b): "While environmentally related performance would provide a measure of the affect [sic] desired, it must be related to control technology in order to be assured that adverse environmental impacts are minimized at any particular case." <FN 63> The Proposed Rule does not follow this sentiment categorically.

Footnotes

35 Public Law 92-500, 33 U.S.C. § 1251 ~. (1972).

36 33 U.S.C. § 1311.

37 CWA § 301(a), 33 U.S.C. § 1311(a).

38 "Standards of performance" is defined to mean "a standard for the control of the discharge of pollutants which reflect the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives…" CWA § 306(a)(I), 33 U.S.C. § 1316(a)(I).

39 CWA § 306(b)(I)(B), 33 U.S.C. § 1316(b)(I)(B).

40 CWA § 306(a)(2), 33 U.S.C. § 1316(a)(2).

41 33 U.S.C. § 1326(b).

42 See, 33 U.S.C. § 1342 and § 1311.

43 CWA § 306(b), 33 U.S.C. § 1316(b).

44 See United States Steel Corp. v. Train, 556 F .2d 822, 850 (7th Cir. 1977).

45 CWA § 301.

46 CWA § 306(1)(B).

47 CWA § 306(1)(A).

48 Central Hudson Gas and Electric Corp., Decisions of the Administrator and Decisions of the General Counsel Number 63, Volume 2, 371,379-380 (July 29, 1977). In Central Hudson Gas and Electric Corp., EPA General Counsel has explicitly ruled that the term "any standard" as it is used in section 316(b) applies not only to standards of performance required by section 306, but also to the effluent limitations required to be promulgated pursuant to section 301. Central Hudson Gas and Electric Corp.. Decisions of the Administrator and Decisions of the General Counsel, Volume 2, 371,380 (July 29, 1977) [hereinafter "GC 63"]. In addition, the EPA General Counsel noted that there is no legislative history, nor is there any language within the Clean Water Act itself, which would indicate that Congress intended the application of section 316(b) to be limited in its application to new electric powerplants. Id. at 379. As a result, the General Counsel determined that all powerplants, both new and existing, which have cooling water intake structures and point sources of discharge are subject to the provisions and requirements of section 316(b). Id. at 380.

49 United States Steel Corporation v. Train, 556 F .2d 822, 850 (7th Cir .1977).

50 Id. at 850.

51 Virginia Electric and Power Company, at 8 ELR 20049 (4th Cir. 1977).

52 Virginia Electric and Power Company, at 20049.

53 Virginia Electric and Power Company, at 20049.

54 Virginia Electric and Power Company, at 20049 (referring to 33 U.S.C. § 1369(B)(1)(e)).

55 U.S. Environmental Protection Agency, "Development Document for Proposed Best Technology Available for Minimizing Adverse Environmental Impacts of Cooling Water Intake Structures" (1973) [hereinafter, 1973 Development Document].

56 38 Fed. Reg. 22606 (August 22, 1973).

57 38 Fed. Reg. 34410 (December 13, 1973) ("1973 Proposed Regulations").

58 1973 Proposed Regulations, at 34410.

59 1973 Proposed Regulations, at 34410.

60 1973 Proposed Regulations, at 34410.

61 In the 1973 Proposed Regulations, EPA stated that

(Part A) App1ilicable Technology. The range of technologies corresponding to the control of the number and types of organisms which interact externally with the intake is comprised of two factors -the choice of the location of the intake relative to the location organisms, and the full array of process modifications, including the use of recirculating cooling water systems employing offstream means to transport process heat directly to the atmosphere and to minimize or in some cases eliminate the use of cooling water. The technology for controlling the number and types of organisms which interact internally with the cooling system is comprised of one factor. In addition to location and flow volume as cited above in for intake interactions, i.e., the degree to which the configuration and operation of the intake means prevents the entry of these organisms into the cooling system. The technology for preventing the entry of these organisms while minimizing damage due to external interactions with the organisms is diverse, including a multiplicity of physical and behavior barriers and covering various fish bypass and removal systems. Devices which cause damage due to internal interactions with process cooling systems relate to the design and operation of these systems with respect to mechanical, thermal, and chemical characteristics. For example, the presence of a cooling tower and a nonrecirculating cooling system could affect the amount of organism damage due to the pumping, temperature changes, and possible chemical additives employed with the tower.
1973 Proposed Regulations, at 34410.

62 1973 Proposed Regulations, at 34411

63 1973 Proposed Regulations, at 34411

EPA Response

This excerpt from commenter's comment does not make any particular argument regarding the rule, but is merely the commenter's view of the history of section 316(b) of the CWA. The regulatory history of section 316(b) of the CWA and legal basis for the final rule are presented in the preambles to the proposed and final rules.

Comment ID 316bNFR.053.007

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

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The Proposed Rule's Interpretation of "Adverse Environmental Effect" Contravenes the CWA (Proposed Rule VII.D)

The Proposed Rule proposed three "alternatives" for defining "adverse." We support the third alternative, i.e., which defines "adverse" as "any impingement or entrainment of aquatic organisms." Indeed, this is consistent with EPA's past interpretation of the section. The 1973 Proposed Regulations also briefly addressed factors germane to assessing adverse environmental impacts, including cooling water intake volume, abundance and species type of effected organisms, system configuration, thermal characteristics, and chemical additives. <FN 64>

Footnotes

64 1973 Proposed Regulations provided in full that:
Adverse environmental impacts that could occur from cooling water intakes relate to the net damage or destruction of benthos plankton and necton organisms by external interaction with the intake structure and by internal interaction with the industrial cooling system. Important aspects of the intake which relate to adverse environmental impacts are the intake volume, the number and types of organisms which interact externally with the intake or which interact internally with the industrial cooling system, the configuration and operational characteristics of the intake and plant cooling system, the thermal characteristics of the cooling system, and the chemicals added to the cooling system for biological control.

EPA Response

Please see response to comment 316bNFR.029.013 for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.053.008

Subject Matter Code	9.3
Documentation of I & E Impacts	

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The adverse effects of intake structures cannot be disputed. Steam electric powerplants generate electricity by creating heat which, in turn, converts "pure" water into high pressure steam. <FN 65> The high pressure steam then race through giant turbines, causing them to rotate at a high rate.<FN 66> The rotating turbines turn electric generators, creating electricity. <FN 67> After the high pressure steam has passed through the rotating turbines, it is typically run through small-diameter tubing surrounded by "non-contact cooling water. " <FN 68> The non-contact cooling water in the condenser tubes cools and condenses the steam back into water.<FN 69> In essence, the non-contact cooling water is used to convert the high pressure steam back into water for recirculation thereafter. <FN 70> Once back in its liquid state, the water is returned to the beginning of the process where it is revaporized into steam to start the process anew. <FN 71> Cooling water is obtained from a source waterbody located outside of the plant. <FN 72> For example, cooling water may be obtained from rivers <FN 73> or oceans. <FN 74>

Powerplants generally use once-through or recirculating closed-cycle cooling systems. <FN 75> A once-through cooling system withdraws water from the source waterbody, runs it through the condenser system and then discharges without recirculation. <FN 76> As the water circulates through the condenser system, it is heated, and thus returns to the environment in a heated state. <FN 77> Once-through cooling systems require a continual supply of cooling water and are more common than closed-cycle systems. <FN 78>

In contrast to once-through cooling systems, closed-cycle cooling systems recirculate and reuse cooling water. <FN 79> As with once-through cooling, cooling water in closed-cycle systems is passed through the condenser system where it is heated in the process of converting steam back to water.<FN 80> After passing through the condenser system, however, the cooling water is transported to cooling towers <FN 81> or to some other process to be cooled. <FN 82> Once cooled, the water is returned to the condenser system and used again in the cooling process.<FN 83> Although the cooling water used in a closed-cycle system is constantly being reused and recycled, some of the water is lost through evaporation and other processes. <FN 84> Therefore closed-cycle systems must "make-up" such losses by making additional withdrawals of cooling water from the source waterbody. <FN 85> The amount of "make-up" cooling water withdrawn from the source waterbody in a closed-cycle system is only two to four percent of the quantity of water used by a comparable once-through system.<FN 86> Accordingly, the adverse environmental impact on aquatic ecosystems is far less from closed-cycle than from once-through systems. <FN 87> "Dry cooling" technologies further minimize these effects by 99 percent.

In total, powerplants and industrial facilities in the U.S. withdraw about 70 trillion gallons of water from U.S. rivers and streams each year for cooling purposes.<FN 88> Powerplants withdraw about eighty percent of that amount --roughly 60 trillion gallons of cooling water per year --or about "fifteen percent of total flow of waters in U.S. rivers and streams." <FN 89> Powerplant demand for cooling

water exceeds 254,500 million gallons per day ("MGD") (254 billion gallons per day ("BGD"))<FN 90> from various source waterbodies including freshwater rivers, streams and lakes, coastal ocean waters, brackish estuaries and ground water.<FN 91> Moreover, the steam electric generating industry's insatiable thirst for cooling water continues as demand for electricity climbs. <FN 92> The relatively unfettered use of cooling water by the utility industry, however, comes at a significant cost to the environment.

Intake Structures remove trillions of aquatic organisms annually, including plankton, eggs, larvae, fish and any other animals or organisms that live in the water. <FN 93> The unfortunate predicament of being sucked into a Intake Structure is usually accompanied by a death sentence. For instance, as is discussed later in these comments, it is estimated that one powerplant alone in New Jersey accounts for productivity losses from the Delaware Estuary of nearly one billion fish annually and is responsible for more annual loss of some fish populations than all commercial and recreational fishing pursuits in the estuary combined. Collectively, the power industry constitutes the country's single largest consumer of aquatic life.

Adult fish and larger organisms drawn into the powerplant by the Intake Structures are entrapped ("impinged") <FN 94> against a Intake Structure's "intake screens." Intake Structure intake screens are designed to filter out debris that would interfere with the operation of, or cause damage to, condenser systems. <FN 95> Impinged organisms usually die or suffer injury as the result of starvation, exhaustion, descaling by screen wash sprays or "asphyxiation when forced against a screen by velocity forces which prevent proper gill movement ... for prolonged periods of time." <FN 96> If an organism or fish impinged against an intake screen is lucky enough to be removed from the screen while it is alive, it still has a diminished chance of survival; these fish may suffocate in the fish return system, be terminally injured, or otherwise be more susceptible to predation. <FN 97>

Aquatic organisms not removed from the cooling water by the intake screens are "entrained," meaning they are carried through the powerplant's condenser system. <FN 98> The organisms which become entrained are "relatively small benthic, planktonic and nektonic forms." <FN 99> Entrained aquatic organisms are subject to their own perils and are usually euthanized as a result by: "physical impact in the pump and condenser tubing, pressure changes [which result in embolisms, or rupturing of fish ballast air bladders] caused by diversion of the cooling water into the plant or by the hydraulic effects of the condensers, thermal shock [as cooling water is heated in the cooling process, and by] chemical toxemia induced by antifouling agents such as chlorine." <FN 100> For some species of fish, the intake represents a double jeopardy situation where the same population will be subject to increased mortality through entrainment of eggs and larvae as well as through impingement if they ever live to be juveniles and adults. <FN 101>

In addition to the impacts caused to organisms drawn into the cooling system, aquatic organisms may also be harmed as the result of damage to their aquatic habitat caused by a powerplant's discharge of heated water. <FN 102> The thermal discharges consist of water which is released back to the source waterbody after it has proceeded through the powerplant's condenser system. <FN 103>

Clearly, therefore, the cooling process adversely impacts aquatic ecosystems. <FN 104> For example, as EPA has noted, cooling water systems "may interfere with the maintenance or establishment of optimum yields to sport or commercial fish and shellfish, decrease populations of

endangered organisms, and seriously disrupt sensitive ecosystems." <FN 105>

Footnotes

65 1993 BACKGROUND PAPER No.2 at 3.

66 Clark and Brownwell, ELECTRIC POWER PLANTS IN THE COASTAL ZONE: ENVIRONMENTAL ISSUES (American Littoral Society Special Publication No.7, October, 1973) (hereafter "ELECTRIC POWER PLANTS."

67 ELECTRIC POWER PLANTS at 111-1.

68 ELECTRIC POWER PLANTS at 111-1-4. See also, 1993 BACKGROUND PAPER No.2 at 3.

69 Id.

70 1993 BACKGROUND PAPER No. 2 at 11, and ELECTRIC POWER PLANTS at 111-1.

71 1993 BACKGROUND PAPER No. 2, at 10, and ELECTRIC POWER PLANTS at 111-1.

72 1993 BACKGROUND No. 2, at 3, and ELECTRIC POWER PLANTS at 111-1-4.

73 1993 BACKGROUND PAPER No.2 at 2-3; See, e.g. Carolina Power and Light Company, Brunswick Steam Electric Plant Units I and 2, National Pollutant Discharge Elimination System Permit No. NC0007064 (U.S. EPA Nov .7, 1977) discussed infra.

74 1993 BACKGROUND PAPER No.2 at 3. See, e.g. Public Service Company of New Hampshire (Seabrook Station, Units I and 2), National Pollutant Discharge Elimination System Permit Application No. NHOO20338, Case No. 76- 7 (U.S. EPA June 10, 1977) discussed infra.

75 1993 BACKGROUND PAPER No. 2, at 3, and ELECTRIC POWER PLANTS at 111-3-5.

76 Id.

77 Id.

78 Systems which use once-through cooling "represent 59 percent of the total number of units" and "withdraw 71 percent of the total cooling water intake flow. " IQ. at 2-4. Closed-cycle cooling systems represents 36 percent of the total number of units and withdraw 23 percent of the total cooling water intake flow ." 1993 BACKGROUND PAPER No.2 at 2-4.

79 1993 BACKGROUND PAPER No.2, at 3, and ELECTRIC POWER PLANTS at 111-3-5.

80 Id.

81 Id.

82 Id.

83 Id.

84 Id.

85 ELECTRIC POWER PLANTS at 111-5.

86 See generally, U.S. ENVIRONMENTAL PROTECTION AGENCY, PRELIMINARY REGULA TORY DEVELOPMENT, SECTION 316(B) OF THE CLEAN W ATER ACT, BACKGROUND PAPER NUMBER 3: COOLING WATER INTAKE TECHNOLOGIES 2 (1993) [hereinafter" 1993 DEV. Doc., PAPER No.3"] ("Closed-cycle systems recycle their water and typically use only two to three percent of the cooling water flow that is required by once-through systems."), and ELECTRIC POWER PLANTS at 111-5.

87 Incidently, while once-through and closed-cycle cooling systems are the primary methods for obtaining cooling water for the condenser system, use of one does not necessarily preclude use of the other. Some electric generating facilities employ "the concepts of the once-through and closed-cycle cooling systems at the same time. " 1993 BACKGROUND PAPER No.2, at 4. Such a system entails alternating between the two types of cooling systems, which is usually accomplished on a seasonal basis. Id.

88 1973 Proposed Regulations, at 34410.

89 1973 Proposed Regulations, at 34410.

90 Background Paper No.2, at 3.

91 Background Paper No.2, at 11.

92 Over the last five decades the number of steam electric powerplants and electric generating units in the United States has been increasing at an ever significant rate. For instance, in 1941 there were only 31 operational generating units in the United States and its territories which had a combined intake flow of 2, 700 million gallons per day ("MGD"). See, 1993 BACKGROUND PAPER NO.2, at 5 Table 2-3. By 1993, 976 steam electric powerplants and 2,693 generating units were in existence in the United States and its territories Id., at 2. Of these 2,693 generating units in existence, 2,073 are currently in commercial operation. Id., at 3. An additional eight generating units are under construction and a small number are in the planning stages. Id., at 3.

93 U.S. ENVIRONMENTAL PROTECTION AGENCY, DEVELOPMENT DOCUMENT FOR BEST TECHNOLOGY AVAILABLE FOR THE LOCATION, DESIGN, CONSTRUCTION AND CAPACITY OF COOLING WATER INTAKE STRUCTURES FOR MINIMIZING ADVERSE ENVIRONMENTAL IMPACT, at 5-6, 7, 9 (1976) [hereinafter "1976DEV. Doc."].

94 Impingement is the physical blocking of larger organisms by a barrier, generally some type of screen system in the cooling water intake. Id. 1976 DEV. Doc. at 6. See also, 1993 BACKGROUND PAPER No. 3, at 2-5.

95 Id.

96 Id.

97 Id.

98 Entrainment is the incorporation of organisms into the cooling water flow. 1976 DEV. Doc. at 6. See also, 1993 BACKGROUND PAPER NO.3, at 2.

99 1976 DEV. Doc., at 6.

100 1976 DEV. Doc., at 6-7.

101 EPA Technical Guidance Manual for 316(b), Part II at 1, (1976)

102 Id. at 8.

103 1993 BACKGROUND PAPER No. 2, at 3. Congress understood by as early as 1968 that thermal dischargers are "a very important lethal, directive, and controlling factor in the aquatic habitat. It is lethal in that certain high or low levels can directly cause mortalities, directive in that it influences daily and seasonal behavior and controlling in that it affects biochemical reaction rates and consequently influences metabolic rates."
See, Thermal Pollution-1968: Hearings Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works, 90th Cong., 2d Sess. 136 (1968) [hereinafter "Thermal Pollution Hearings"] the subject of which was "The Extent to Which Environmental Factors are considered in Selecting Power Plant Sites, with Particular Emphasis on the Ecological Effects of the Discharge of Waste Heat into Rivers, Lakes, Estuaries and Coastal Waters." These hearings also disclosed that the withdrawal of cooling water may disrupt natural temperature regimes and distribution patterns of the source waterbody; freshwater or saltwater inflows in estuaries may be diminished by powerplant withdrawals of cooling water, "salinity distributions within estuarine areas may be altered," "clean water areas may be contaminated by introduction or redistribution of polluted water withdrawn from another area," "[i]ntake or discharge structures, including dikes or dredged channels, may prevent a normal circulation of water or bar migration of organisms," and "[d]ischarge plumes may interfere with sediment transport." Id.

104 See, 1976 DEV. DOC., at 6; 1993 BACKGROUND PAPER No. 2, at 9.

105 Id.

EPA Response

EPA agrees with the commenter that the effects of intake structures cannot be disputed. Further, the Agency agrees that there is significant loss of aquatic life associated with the operation of intake structures. The Agency believes that for new facilities, which today 's rule addresses, the use of either closed cycle recirculating systems or cooling systems that use an amount of cooling water commensurate with that used by a closed cycle systems are preferable. Further, EPA is promulgating today's rule in an effort to minimize the adverse environmental impact associated with cooling water intakes. Please see Response to Comment 316bNFR.056.005 and section VI.B of the preamble for additional discussion of issues raised in this comment.

Comment ID 316bNFR.053.009

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

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Organization Mid-Atlantic Environmental Law Center & Widener University Environmental Law Center

Alternative 3 would be consistent with EPA's past interpretation of section 316(b). The 1976 Rules addressed how adverse impact should be minimized. By reflecting that "minimizing" means "reducing to the smallest possible amount or degree,<FN 106> EPA rejected utilities' argument that it should narrow section 316(b)'s focus on environmental impact solely to those respecting damage to long-term fish populations and aquatic ecosystems, and otherwise ignore the number of fish and other aquatic organisms actually killed or damaged. <FN 107> Similarly, EPA rejected industry's averment that a finding under section 316(a) that the thermal component of a discharge does not disrupt balanced indigenous aquatic communities makes unnecessary further inquiry into section 316(b).<FN 108> On point, EPA observed that: "the Agency should not be precluded from addressing evident entrainment problems simply because the plant's thermal effluent is not itself environmentally unacceptable. The concerns of the two sections are different and the legal standards by which compliance with their requirement are to be judged are similarly distinct." <FN 109>

In short, every intake structures has an adverse effect; thus, every intake structure must "reflect" BTA {discussed below) for minimizing that effect, not just some arbitrary portion of intake structures. Thus, the Proposed Rule's approach here contravenes the CWA.

Footnotes

106 1976 Regulations, at 17388.

107 1976 Regulations, at 17389.

108 1976 Regulations, at 17389.

109 1976 Regulations, at 17389.

EPA Response

EPA agrees with the assessment made in the commenter's first paragraph. Please see response to comment 316bNFR.029.013 and section VI.B.2 of the preamble for today's rule for more discussion of EPA's interpretation of AEI.

Comment ID 316bNFR.053.010

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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VIII.A.1 Design:

Section 316(b) requires that an intake structure "reflect best technology available." As discussed in Part IV .E. of The Quick and the Dead, BTA is and has been for 20 years, closed-cycle cooling. And as the comments submitted by Riverkeeper, Inc., (dated November 8, 2000) clearly demonstrate, BTA is now clearly "dry cooling" technology. Yet rather than requiring performance consistent with dry (or closed-cycle) cooling technology, EPA merely requests comments on whether it should adopt a zero-intake flow requirement, "commensurate with levels achievable through the use of dry cooling systems." <FN 110>

We believe the rules should require BTA performance commensurate with dry cycle cooling. It is clear dry cooling reflects BTA to minimize adverse environmental impacts. For example, the Salem Nuclear Generating Station on Artificial Island, New Jersey, presently uses 2.1 million gallons of water per minute out of the Delaware Bay. It has been estimated that the employment of dry cooling technology at Salem would reduce the intake flow volume to just 420 gallons per minute. <FN 111> More significantly, this reduction in intake flow volume could reduce fish kills at Salem by over 99%, saving billions of fish. <FN 112>

While the cost of a dry cooling system can be as much as three times that of a comparable wet cooling system, <FN 113> the cost of the technology is clearly not wholly disproportionate to the environmental benefit gained. In fact, because dry cooling was determined to be a viable option, a recent decision held that the capacity of a Intake Structure could be limited so as to require the implementation of dry cooling technology over other cooling technologies. <FN 114> Furthermore, there is clear evidence that the use of dry cooling technology is an achievable goal. In the North America, over 50 electrical generation facilities ranging in capacity from 1MW to 645MW (the Athens Generating Station, a 1,080MW dry cooling facility, has been permitted but is not yet operational) currently use a dry cooling system. <FN 115> EPA is strongly urged to act consistent with the intent of CWA 316(b) and adopt a zero intake flow requirement.

Footnotes

110 65 Fed. Reg. 155,49080 (2000).

111 Delaware River Keeper comments regarding the Salem Nuclear Generating Station Permit Application, 4 August 2000.

112 Id.

113 65 Fed. Reg. 155, 49081 (2000).

114 Athens I, supra note 5, at *33.

115 65 Fed. Reg. 155, 49081 (2000).

EPA Response

EPA agrees that closed-cycle recirculating wet cooling reflects, in part, best technology available for minimizing adverse environmental impact for this national rule for new facilities. EPA disagrees that dry cooling reflects best technology available. See Section V.C of the preamble to the final rule for a thorough discussion of the factors that EPA considered in rejecting dry cooling.

The example presented by the commenter for the Salem Nuclear Generating Station is useful to show how dry cooling compares to once-through wet cooling. However, the commenter fails to compare the dry cooling flow reductions to wet cooling tower flows. If the Salem Station were to adopt closed-cycle recirculating wet cooling similar to other estuarine situated plants, EPA estimates that the cooling intake flow would be approximately 168,000 gpm, which is 92 percent less than the once-through flow. The commenter claims that dry cooling would reduce intake flow to 420 gpm, thereby saving billions of fish, but fails to say exactly how many fish nor over what time period. For the sake of argument, EPA will estimate this at 2.100 million organisms saved per year with the dry cooling system (i.e., 1 fish is entrained each year per gallon per minute of intake). In turn, for this entirely hypothetical example, the dry cooling system save approximately 2.099 million organisms a year. A typical recirculating wet cooling tower would reduce the intake flow to at least 168,000 gpm, thereby saving 1.93 million organisms per year in this hypothetical example. The comparative difference between the dry and wet towers is 170,000 organisms, an 8 percent difference. While this example is purely hypothetical, EPA views it as illustrative of the comparative reduction in entrainment of dry cooling versus wet cooling. EPA views the difference between the systems as significantly less dramatic than the commenter purports. In EPA's view, the incremental improvements from wet towers to dry towers does not "require" that best technology available to minimize impingement and entrainment be based on dry cooling. [Note: the example above is for an estuarine environment where make-up water requirements are higher than for freshwater. Therefore, the difference between the dry and wet system would be even less for a fresh water system, by another three percent, approximately.]

The commenter recognizes the economic trade-offs of dry cooling versus comparable wet cooling towers. However, EPA disagrees with the conclusions reached by the commenter. As stated in the preamble, EPA is not using a wholly disproportionate test to determine what is economically practicable. Instead, EPA is using a cost to revenue test. See section V.C of the preamble to this rule and the Economic Analysis. In addition, EPA considers that wet cooling reduces impingement and entrainment a tremendous amount, at much less cost (by greater than a factor of three on a facility level basis). It does not make sense to require dry cooling considering the disadvantages of the systems, as outlined in Section V.C of the preamble to the final rule.

EPA disagrees that a single court case in New York State which concluded that dry cooling is best technology available in that single instance means that the technology is appropriate, efficient, or applicable for a national rule.

EPA understands that there are significant examples of demonstrated dry cooling plants in the United States. EPA points out that the largest demonstrated US plant in the commenter's examples is a 640 MW plant, the Linden Cogeneration Plant, in NJ. The decision for this plant to adopt dry cooling over wet cooling was not related to a 316(b) determination, but rather, a highway safety issue. EPA points

out that the cycle cogeneration unit has a comparable cooling capacity to that of a small-sized coal-fired facility (i.e., 285 MW of steam). Because cogeneration units are designed to deliver steam to adjacent manufacturing plants for their use in processes, the plant will be designed such that only a portion of its steam generation requires cooling. Therefore, the Linden cogeneration plant in the example presented by the commenter currently is fitted with much smaller cooling capacity than an equal sized coal-fired or nuclear power plant. Therefore, this example is not appropriate for demonstrating the wide-spread efficacy of dry cooling at the types of power plants projected to come on-line during the next twenty years. Considering that 14 coal-fired facilities are projected within the scope of this rule alone, the applicability and feasibility of a national dry cooling based option is not bolstered by this comment. EPA also would not want to apply this requirement solely to combined-cycle facilities, because doing so may create a disincentive to building those facilities, which have environmental advantages over continuing to modify existing facilities. See responses to comments 316bNFR.006.007 and 316bNFR.206.014 and Chapter 4 of the Technical Development Document.

Comment ID 316bNFR.053.011

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

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VIII.A.2. Location.

As discussed in The Quick and the Dead, <FN 116> § 316(b) requires that the "location" of an intake structure "reflect" BTA "for minimizing adverse environmental impacts." This is for all "waters of the U.S.," and not just some waters that EPA deems compliance worthy. Nonetheless, §125.84 of the Proposed Rule makes compliance with § 316(b) a function of the distance of the structure from, alternatively, the shoreline or the littoral zone. In the latter case, compliance is a function of whether the water is designated by the permitting agency at the time of permit issuance to be (1) freshwater river or stream, (2) lake or reservoir, (3) estuary or tidal river, or (4) ocean. <117> Furthermore, the rule drastically diminishes compliance requirements for areas outside of waters as "littoral zones." In short, the farther from a littoral zone identified by the permitting agency, the lesser the required compliance. For example, in the case of freshwater streams, intake structures located at least 50 meters outside of the littoral zone in freshwater streams -- even those that are ecologically sensitive or have migrating fish stocks --would warrant "the least stringent set of minimum requirements." <FN 118>

This approach contravenes both the CWA and sound science. Because some littoral zones extend far from shore, it would be difficult to have a regulatory requirement based on a fixed distance from shore that would protect the majority of aquatic organisms at all locations. Depth, water clarity, water velocity and other factors generally determine the extent of the biologically functional littoral zone, not distance from shore. The suggested regulatory language on page 109 would be under-protective at some locations, over-protective at others, and generally difficult to apply.

Footnotes

116 Id. at 459.

117 65 Fed. Reg. 155, 49063 (2000).

118 Id. at 49084.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I

to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.053.012

Subject Matter Code	10.01
	Regulatory Framework Options

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As explained in IV.2. of The Quick and the Dead, § 316(b) allows no such parsing, and the rule functionally waives BTA altogether for many waters. The location of an intake structure is a crucial determination that can have a monumental impact on surrounding ecosystems. During EPA ' s 1976 attempt at promulgating a 316(b) rule, it recognized that the "location" of an intake structure "can be the most important consideration relevant to applying the best technology available for cooling water intake structures." <FN 119> A 1993 EPA document recognizes that decisions concerning the location of a Intake Structure require an "extensive ecological survey in the vicinity of the proposed site." <FN 120> The purpose of the survey is to identify potential impacts an intake structure may have "to important wildlife and aquatic breeding, nursery, feeding, and/or migration areas," and it may "enable determinations to be made with regard to concentrations of aquatic life within specific and proposed siting areas." <FN 121> EPA recognizes that the "determinations regarding the location of an intake structure are dependant on the physical characteristics of the source waterbody to be used as well as hydraulic and economic factors." <FN 122>

While EPA recognizes the importance of intake structure location, the proposed method to address location is not supported by research. EPA has not offered any proof that demonstrates that environmental harm due to CWISs has varying levels of severity that relate to the four categories of water body types. An extensive review of the docket confirms that in fact, no proof exists. The only document in the docket delineating the four categories simply provides definitions of the four categories. <FN 123> The document fails to present any basis upon which a relationship might be realized between the particular body of water in which the cooling water intake structure is located and environmental harm.

Footnotes

119 Effluents Guidelines Division, office of Water and Hazardous Materials, United States Environmental Protection Agency, Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact 5-9, 178 (1976) [hereinafter 1976 Development Document].

120 EPA, Science Applications International Corporation, Background Paper No.3: Cooling Water intake Technologies 2, 2 (Dec. 13, 1993) (Preliminary Draft) [hereinafter Background Paper No.3].

121 Id.

122 The Quick and the Dead, supra note 10, at 460.

123 Section 316(b) Regulatory Development Project. Definitions for Zones of Biological Concern in Freshwater Rivers and Streams, Lakes and Reservoirs. Estuaries, and Oceans. DCN: 1-5043-PR, 10 Feb, 2000.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish

between waterbody types or the location of the intake structure within the waterbody type. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types.

EPA decided for the new facility rule that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

EPA did not vary the performance requirements based on waterbody type because it found problems in defining and implementing a littoral zone approach and found that reducing impingement and entrainment on fresh water bodies to the same level as in estuaries and oceans to be technically feasible and economically practicable.

Comment ID 316bNFR.053.013

Subject Matter Code	10.01
	Regulatory Framework Options

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There is absolutely no basis for defining a 50 meter setback for freshwater systems. EPA has not identified any research suggesting such a setback is appropriate and in fact confirms this lack of basis by seeking comment on other set back possibilities including 100 and 200 meters. <FN 124> EPA's clear lack of pre-proposal investigation is not tantamount to an "extensive ecological survey" and has not adequately identified potential impacts an intake structure may have "to important wildlife and aquatic breeding, nursery, feeding, and/or migration areas" based on the proposed locations. <FN 125> Only when there is quantitative data that clearly indicate the relationship between the severity of environmental harm and the proposed categories and setbacks should the proposed categories or a similar scheme be considered.

Footnotes

124 65 Fed. Reg. 155, 49085 (2000).

125 Background Paper No.3, supra.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. See response to comment. Please see response to comment 316bNFR.053.012.

Comment ID 316bNFR.053.014

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Subject Matter Code 10.01

Regulatory Framework Options

The creation of four different categories would also create ambiguities that would allow permittees to argue their way out of the requirements of §316(b), i.e., arguing that an estuary is an ocean or freshwater river. Or arguing that an intake structure in a freshwater river has a setback of greater than 50 meters. The Proposed Rule invites such arguments, even though they are beside the point.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Please see response to comment 316bNFR.053.012.

Comment ID 316bNFR.053.015

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Subject Matter Code 10.01

Regulatory Framework Options

In short, the design and location-driven aspects of the proposed rule have no statutory basis, are not supported by science, and invite endless arguments about how the distinctions should be applied. We therefore recommend that EPA abandon this approach in favor of one that ensures BTA for all waters, and not just some waters, yet to be identified.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Please see response to comment 316bNFR053.012.

Comment ID 316bNFR.053.016

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

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As discussed in Part IV .D. of The Quick and the Dead, an intake structure is just that: the structure that withdraws cooling water. A 1976 Rule 316(b) Development Document defined Intake Structure as comprising "the total structure used to direct cooling water from a water body into the components of the cooling system...[to the] circulating and service water pumps where those pumps are located in the cooling system prior to the heat exchanger or condensers." <FN 126> In practice, EPA has interpreted the external limits of the definition broadly. For example, when faced with determining whether a canal that directed water to a Intake Structure was included in the definitional scope of "Intake Structure," a Regional Administrator determined that the canal was part of the "cooling water intake structure." <FN 127> The Quick and the Dead presents an inclusive review of decisions that have evolved the definition of "intake structure," <FN 128> as one that "includes all structures and components of the intake system which are an integral component of the Intake Structure, that is, all structures which are necessary for withdrawing cooling water out of the source waterbody and into the cooling system." <FN 129> Nevertheless, the Proposed Rule seeks to curtail the definition of intake structure to be that extending "from the point at which water is withdrawn from the surface water source to the first intake pump or series of pumps." <FN 130>

While EPA's proposed definition correctly limits internal inclusion to the pumps, it fails to adopt the accepted broad external definitional limits. Under the proposed definition, the external limit of the intake structure would be the "point at which water is withdrawn from the surface water source." <FN 131> The proposed definition remains sufficiently ambiguous as to invite litigation over the exact point to which the definition refers. For example, in the case of a canal that is used to direct water to the physical intake structure, the proposed definition would still invite argument that the water is not "withdrawn" until it leaves the canal, even though this canal would clearly be one of the components of the intake system "integral" to the Intake Structure. <FN 132> Because the proposed rule's external limit on the definition of Intake Structure is ambiguous, it should be clarified or removed.

Footnotes

126 1976 Development Document, supra, at 2-3.

127 In re Brunswick Steam Electric Plant, Region 4, at 85 (Nov. 7, 1977) Initial Decision re: Permit No. NC007064 [hereinafter Brunswick].

128 The Quick and the Dead, supra, at 469.

129 1d at 470.

130 65 Fed. Reg. 155, 49066 (2000) (emphasis added).

131 65 Fed. Reg. 155, 49066 (2000) (emphasis added).

132 The Quick and the Dead, supra note 10, at 470.

EPA Response

The final rule defines "cooling water intake structure" to mean the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. It also explicitly provides that the cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps.

How the definition of "cooling water intake structure" is applied to a particular facility should be based on consultation between the permittee and the permitting authority. In determining whether a water conveyance system is part of the cooling water intake structure the permitting authority is to consider whether the structure or constructed water way is used by the facility to withdraw water from the source waterbody (which must be a "water of the U.S.") into the cooling water system. Canals are part of the intake structure.

Comment ID 316bNFR.053.017

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

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The proposed rule also mistakenly curtails the definition of intake structure as "the total physical structure and any associated constructed waterways used to withdraw water from waters of the U .5., provided that at least twenty-five (25) percent of the water withdrawn is used for cooling purposes." <FN 133> Congress did not grant EPA the authority to eliminate certain intake structures from the mandates of CWA § 316(b). To be sure, § 316(b) applies to all categories of point sources. <FN 134> Additionally, defining intake structures on the basis of the percentage of water used for cooling presents opportunities for environmentally damaging structures to escape regulation.

Defining intake structures as EPA has proposed might actually increase fish kills due to impingement and entrainment because the definition encourages designers to reconfigure water balances, thereby ostensibly reducing the percentage of water used for cooling to something less than 25 percent, while not reducing environmental impact whatsoever. A plant that has an intake volume of 2 MGD with exactly 25 percent, or 500,000 gal/day, of the intake water being used for cooling purpose can escape regulation if it finds a way to take in for example, 2.3 MGD but leave unchanged the volume of water used for cooling purposes (500,000 gal/day). Under that scenario, the 500,000 gal/day used for cooling purposes would only amount to 22% of the total volume of water taken from the water body in a day, thereby escaping regulation. Even in the absence of design alterations seeking to remove a facility from the dictates of 316(b), EPA recognizes that a "portion" of manufacturing facilities use more than 75 percent of their intake flow for process water and other uses unrelated to cooling. <FN 135> A manufacturing facility using such a water usage distribution (less than 25 percent for cooling) would not be within the scope of the proposed rule. Presumably, plants falling outside of the proposed definition would be regulated on a case-by-case basis which, as EPA has acknowledged, presents unique problems. <FN 136>

Congress allowed none of this. Section 316(b) does not exempt compliance for "intake structures" based on relative capacity. There is no basis for limiting application of the rule only to those facilities using at least 25 percent of intake volume for cooling purposes.

Footnotes

133 65 Fed. Reg. 155, 49065 (emphasis added).

134 United States Steel Carp. v. Train, 556 F.2d 822, 849-50 (7th Cir. 1977)

135 Id. at 49068.

136 See Id. at 49079: indicating case-by case approach requires "significant resources on the part of the regulatory authorities"; indicating historically, use of case-by-case approach might result in "permitting decisions that are less consistent than they would be if national requirements were in place"; indicating the case by case approach "results in less predictability regarding what is or may be required for a particular facility, which makes planning difficult for industry and leaves regulatory agencies uncertain about the appropriate requirements.")

EPA Response

EPA has moved the 25 percent threshold from the definition of "cooling water intake structure" and it is now in the applicability clause in section 125.81. This means that it establishes the applicability of today's rule but does not limit the definition of "cooling water intake structure." EPA disagrees with the commenters assertion that the threshold would encourage designers to reconfigure water balances. In fact, EPA believes that the final rule will encourage reuse of cooling water and process water, since cooling water that is reused is not counted as cooling water for purposes of the applying the 25 percent new facility threshold.

EPA believes that setting such a threshold for purposes of establishing the scope of today's rule is appropriate. In regulating cooling water intake structures EPA must establish the regulatory framework under which to meet the goals of the statute. EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. EPA predicts that only four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities will not meet the 25 percent threshold. These facilities will not escape regulation under section 316(b), rather, the will be addressed by permit writers on a best professional judgment (BPJ) basis. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a BPJ basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.053.018

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Subject Matter Code 14.0

Best Technology Available-Additional Design and Construction Technologies

Additional Design and Construction Technologies:

We concur that EPA should develop a "clearinghouse/inventory" of section 316(b) technologies used around the country. Such an inventory could be patterned after the "BACT/RACT/LAER" clearinghouse EPA uses in the air program. Part IV.C.1 & 4 provides discussion of some potential BTA designs.

EPA Response

The record for this rule, including the Technical Development Document, provides information on the 316(b) technologies available for use. As part of future support for the implementation of this rule and the Phase II and III rules, EPA will consider the benefits and cost of establishing or supporting a clearinghouse/ inventory of 316(b) technologies.

Comment ID 316bNFR.053.019

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

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The Proposed Rules suggest that "Restoration Measures" may be an appropriate mechanism to satisfy the requirements of CWA § 316(b) and invites comment on the appropriateness of such measures. <FN 137> EPA's vision is that:

"under any approach there would be a nexus between the restoration measures employed and the adverse environmental impact caused by a cooling water intake structure. For example, if after implementation of direct control technologies an important species in the vicinity of the cooling water intake structure continues to be adversely affected by a cooling water intake structure, appropriate restoration measures would address the adverse effects on that species, perhaps through enhancement of other factors that affect the target species' ability to thrive or as a last resort, replacement of the fish killed or harmed." <FN 138>

But EPA's view in this regard is blurry. Consideration of any restoration measures with regard to a 316(b) BTA determination is inappropriate. Congress has instructed that BTA should be employed for cooling water intake structures with the goal of minimizing adverse environmental impacts. The adverse impacts contemplated under CWA 316(b) are those caused by impingement and entrainment of aquatic organisms found in the body of water in which the intake structure is located. Section 316(b) provides no basis for restoration measures that would offset impingement and entrainment harms so long as the overall population of a particular species in the area is unchanged.

In fact, where Congress has allowed for such a consideration, it has explicitly stated so. As discussed in The Quick and the Dead, if Congress had intended for the same type of restoration measures to be appropriate with regard to intake structures, it would have explicitly stated as much. <FN 139> Congress has in fact, considered and specifically rejected EPA 's proposal to alter CWA §316(b) and permit restoration measures. For example, in 1982 EPA proposed that Congress alter the language of CWA §316(b) so BTA could be achieved through "measures equal in effect to the best technology available to mitigate adverse effects." <FN 140> Congress decided not to adopt EPA' s recommendation. Congress has also rejected recent efforts to change the law to allow for mitigation.

Even EPA has recognized that there is no basis for restoration measures under CWA 3l6(b). For example, the Regional Administrator for EPA Region IV, when rendering the Brunswick NPDES permit initial decision, stated that "even if the adverse effects associated with entrainment and impingement would not cause an 'imbalance,' they must nevertheless be minimized under [s]ection 316(b)." <FN 141>

The plain language of CWA 316(b), Congress' s specific rejection of restoration measures under CWA §316(b), and the EPA decision in Brunswick support the notion that restoration measures are not appropriate to mitigate entrainment and impingement harms caused by cooling water intake structures. An exhaustive discussion on the many reasons restoration measures are not appropriate to

satisfy CWA §316(b) is offered in The Quick and the Dead. <FN 142> EPA must forego the inclusion of restoration measures as an acceptable alternative to compliance by intake structures.

Footnotes

137 65 Fed. Reg. 155, 49089 (2000).

138 Id. at 49090-91.

139 The Quick and the Dead, supra note 10, at 484.

140 Clean Water Act Amendments of 1982: Hearings on S. 777 & S. 2652 Before the Subcomm. On Environmental Pollution of the Comm. On Environment and Public Works, 97th Cong., 2d Sess. 279 (1982} at 113.

141 Carolina Power and Light Company, Brunswick Steam Electric Plants Units 1 and 2, National Pollutant Discharge Elimination System Permit No. NC0007164 (U .S. EPA Nov. 7, 1977) at 27.

142 The Quick and the Dead, supra note 10, at 478.

EPA Response

See preamble sections V.B.2.f and VI.L for discussions on the basis and role of restoration measures in today's final rule. EPA believes that the Brunswick case is distinguishable because it reflects a view interpreting section 316(b) under a case-by-case approach rather than a technology based approach. See 316bNFR.210.021. Further, EPA's interpretation of the statute is governed by Chevron 467 U.S. 838, 843 (1993) rather than congressional inaction. Such inaction may have occurred for many reasons.

Comment ID 316bNFR.053.020

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Section 316(b) Does Not Allow for Consideration of Compliance Costs

Section 316(b) does not allow for a cost/benefit analysis in the determination of BTA. EPA may not do what Congress chose not to do. For the reasons explained in Part VI of The Quick and the Dead,<FN 143> unlike other provisions of the CWA (and other environmental laws), § 316(b)'s BTA requirement does not allow a cost/benefit analysis. This is contrary to other congressionally imposed tests that permit consideration of technology cost as it relates to industry viability. For example, Congress has often used the phrase "best technology available economically achievable" when it desired consideration of industry achievability and viability. Under CWA 316(b) however, Congress decided to forego use of that terminology and opt for a clear intention that BTA be implemented without regard to industry viability.

A recent decision by a state agency supports the proposition that § 316(b) does not allow a cost/benefit analysis. In a very recent decision, when reviewing the decision of an Administrative Law Judge who used a cost-benefit analysis to opt for the less superior cooling technology in a 3l6(b) determination, the Commissioner of the New York Department of Environmental Conservation concluded that insofar as the judge's "decision may have implied the requirement of a cost/benefit analysis under Section 3l6(b), it was incorrect." <FN 144>

Accordingly, the Proposed Rule's "economic achievability" test, discussed below, is not legal and should be abandoned.

Footnotes

143 The Quick and the Dead, supra note 10, at 471

144 Id.

EPA Response

EPA wishes to point out that it did not use a cost/benefit analysis in the determination of BTA. The commenter seems to confuse a cost/benefit test with the economic practicability test used by EPA.

See response to 316bNFR.206.014 for an explanation of the cost test used in this rule (economic practicability).

Comment ID 316bNFR.053.021

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Subject Matter Code 18.1

Elimination of "Wholly Disproportionate" Cost Test

The Proposed Rule Would Substitute Improper Total Cost Tests for the Long-Standing "Wholly Disproportionate" Test, Ignore Environmental Considerations, and Ignore the Marginal Costs of Compliance to Ratepayers

Assuming arguendo that costs are relevant, the Proposed Rule abandons its own longstanding "wholly disproportionate" cost test. Section 125.84 of the Proposed Rule would create a standard allowing interested persons to "request that the Director impose alternative BTA requirements by demonstrating that compliance with the requirements would result in compliance costs wholly out of proportion to the costs EPA considered in establishing the national standards." <FN 145>

As discussed in Part V of The Quick and the Dead, these costing standards proposed is not in line with the "wholly disproportionate" test used and reaffirmed numerous times since it was originally introduced in 1977, <FN 146> That standard allows argument over whether a superior intake structure technology must be implemented only when the cost of BTA is "wholly disproportionate to the environmental benefit to be gained."<FN 147> "Thus, in determining BTA [under 316(b)], a lone finding that the costs outweigh the environmental benefits to be gained is insufficient." <FN 148>

Under the "wholly disproportionate" test, even where a technology is cost prohibitive, the technology must still be required under CWA 316(b) if the environmental benefit to be gained is significant. For example, when making a § 316(b) determination regarding the John Sevier Steam Plant, EPA decided that a detention dam was considered to be part of the cooling water intake structure.<FN 149> EPA determined that the cost of removing the dam was wholly disproportionate to the environmental benefit to be gained and therefore, did not require removal of the detention dam to satisfy the requirements of 316(b). <FN 150> EPA noted however, that if, in the future, environmental benefits associated with the removal of the detention dam were determined to be greater than originally projected, the cost of removal of the detention dam may no longer be wholly disproportionate and removal of the detention dam would be required under 316(b). <FN 151>

With the Proposed Rule, "costs EPA considered in establishing the national standards," <FN 152> would be determinative. In addition, the Proposed Rules would allow application of a “compliance cost/revenue test," which compares "the magnitude of annualized compliance costs with the revenues the facility is expecting to generate." <FN 153> Because the costs EPA considered were done so with an interest in promulgating BTA standards that would be economically achievable, either proposed test disregards Congress's clear intentions (and EPA's adopted policy) to employ BTA without consideration of industry viability but rather, environmental benefit to be gained. Under this new test, a cost v. cost test, environmental and water quality concerns are abandoned, frustrating the goal of the CWA to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." <FN 154>

Furthermore, the law is well settled that the appropriate standard, if any, is to ensure that the cost of the new technology is not "wholly disproportionate" to the environmental benefit to be gained. <FN 155> Either of EPA 's proposed compliance cost/revenue tests would thwart 23 years of determinations that have applied the "wholly disproportional" test to be valid in favor of a test that essentially takes concern for the environment out of the BTA analysis. For example, if a facility expected to operate on a low profit margin and therefore, expected low revenues, the cost of many technologies would likely be high in comparison to expected revenues. Under such a scenario, EPA's compliance cost/revenue test would dictate that the facility need not comply with BTA standards. Such an analysis completely disregards concern for the environment and only looks at the financial viability of a new facility and its associated ability to implement BTA. A test that places the emphasis on the financial viability of a new facility rather than the environmental benefit of available technologies surely cannot satisfy the intent of Congress when they required that "cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." <FN 156> The more appropriate test "wholly disproportionate test, "gives presumptive weight to the value of environmental benefits " and not to cost of implementation. <FN 157>

Footnotes

145 65 Fed. Reg. 155,49063 (2000).

146 See Brunswick, supra note 24; In re Athens Generating Company, 2000 N. Y. Env Lexis 40, *50 (Apr. 26,2000) [hereinafter, Athens II].

147 Athens II, supra note 34, at *50.

148 Athens I, supra note 5, at *29.

149 Fact Sheet, Application for NPDES Permit to Discharge Treated Wastewater to U.S. Waters for John Sevier Plant Owned by Tennessee Valley Authority, Application No. TN0005436 (Jan. 23, 1986).

150 Id.

151 Id.

152 65 Fed. Reg. 155, 49063 (2000).

153 65 Fed. Reg. 155,49095 (2000).

154 33 U.S.C. § 1251(a).

155 See Brunswick, supra note 24; Athens I, supra note 5.

156 33 U.S.C.A. §1326(b) (CWA §316)) (emphasis added).

157 Athens I, supra note 5, at *30.

EPA Response

EPA’s “wholly disproportionate cost” alternative is only to be applied where the applicant can demonstrate that EPA failed to appropriately consider costs in this rulemaking. It is not, as the commenter suggests, to substitute for the economic practicability standard, but to provide flexibility in

the case where the record for this rule did not account for costs that are faced by a particular facility. As this rule addressed industry costs generally, it would be expected that this provision would most likely be used by a manufacturer in an industry not studied in this rulemaking. See 316bNFR.206.032 for a discussion of the legal basis for the alternative requirements provision in the rule.

See response to 316bNFR.206.014 for an explanation of the cost test used in this rule (economic practicability). For further information on EPA's position on use of the "wholly disproportionate" test for BTA determination, see EPA's response to comment 316bNFR.052.009 above.

Comment ID 316bNFR.053.022

Author Name	James R. May
Organization	Mid-Atlantic Environmental Law Center & Widener University Environmental Law Center

Subject Matter Code 18.1

Elimination of "Wholly Disproportionate" Cost Test

It elects not to focus on the marginal costs of compliance to the ratepayer. As discussed in Part V.A. of The Quick and the Dead, marginal, and not total costs, or costs v. revenue, should be the determinitive economic metric used in applying the "wholly disproportionate" test. For example, EPA applied this in the Brunswick case. The Proposed Rule should explain why this test was abandoned.

EPA Response

EPA disagrees with the commenter's claim that the "wholly disproportionate" test is required for BTA determination. EPA rejected the "wholly disproportionate" test, or a test based on ratepayer increases, because that test balances costs and benefits and EPA believes that the language of Section 316(b) can reasonably be interpreted to mean that EPA should use an economic test as is used for Best Available Technology and Best Available Demonstrated Control Technology. These tests look to the affordability for the industry as a whole and barrier to entry (in the case if NSPS). These tests do not require EPA to demonstrate receiving water quality benefits. See response to 316bNFR.206.014. For a discussion of the alternative requirements provision, see 316bNFR.053.021. Also, see EPA's response to comment 316bNFR.052.009 above.

Comment ID 316bNFR.053.023

Subject Matter Code	24.5
EEA - Estimation of Benefits	

Author Name James R. May

Organization Mid-Atlantic Environmental Law Center & Widener University Environmental Law Center

As discussed in Part IV .B., any cost test needs to account for the associated benefits of BTA. These benefits can be estimated and then used to offset purported costs. That these economic benefits -- which are substantial --may be difficult to ascertain is no reason to disregard them.

EPA Response

EPA did not use a cost-benefit comparison as suggested by the commenter. Instead, EPA looked to economic practicality or achievability which is analogous to how EPA determines BAT for existing point source discharges or best available demonstrated control technology for new sources. See Response to comment 316bNFR206.014. Under such a technology-based approach, EPA need not demonstrate effects on the receiving water in order to establish requirements.

EPA's analysis indicates that most facilities will already meet the requirements of the rule. However, at the few facilities where the facility would not have met the requirements of the rule but for the promulgation of the rule, the Agency agrees that the benefits of BTA may be substantial. The Agency further agrees that these benefits are difficult to ascertain. The challenges to estimating the benefits of the 316b rule include the complexities of trying to estimate fishery impacts and associated economic values for a wide range of facilities and settings, especially where many of the benefits are for goods and services that are not traded in markets (i.e., many of the key benefits in the form of "nonmarket" goods). This is even more challenging for the New Facilities rule, where the locations, designs, and operating characteristics of future cooling water intake facilities is unknown.

The Agency further agrees that the fact that benefits may be difficult to ascertain "is no reason to disregard them." The Agency is not disregarding benefits, even if hard to measure. Indeed, that is why the Agency has attempted in this New Facilities rulemaking to provide a fairly detailed discussion of what types of benefits are likely to arise, thereby indicating in a qualitative manner what benefits may be realized due to the rulemaking. For the forthcoming Phase 2 and Phase 3 rulemakings for existing facilities, EPA is considering whether it is feasible to pursue a more extensive effort to provide quantitative estimates for selected benefits categories.

Comment ID 316bNFR.053.024

Author Name	James R. May
Organization	Mid-Atlantic Environmental Law Center & Widener University Environmental Law Center

Subject Matter Code 10.01

Regulatory Framework Options

CWA §316(b) is an important statute that has far reaching implications for both the aquatic environment and industry .The Proposed Rule fails to encompass the language, purpose or intent of CWA §316(b) by offering too many provisions that reduce the statute's scope. Blurring definitions, permitting economic achievabi1ity considerations, and allowing restoration measures all minimize the effectiveness of the statute. §316(b) has traveled a beaten path and has long suffered in its quest to minimize adverse environmental effects caused by CWISs. EPA should take this opportunity to breath new life into the statute and promulgate a rule that is inspired by the original Congressional intent.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA did not vary the performance requirements based on waterbody type because it found problems in defining and implementing a littoral zone approach and found that reducing impingement and entrainment on fresh water bodies to the same level as in estuaries and oceans to be technically feasible and economically practicable. For new facilities subject to this rule EPA chose the two-track option as the Agency believes it represents the best technology available for minimizing adverse environmental impact.

The commenter took issue with EPA's consideration to economic achievability in determining BTA requirements. EPA addresses this concern in response to comment 316bNFR.053.001 and 316bNFR.206.014.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Dennis Hart

On Behalf Of:

State of New Jersey, Dept. of
Environmental Protection

Author ID Number:

316bNFR.054

Comment ID 316bNFR.054.001

Subject Matter Code	7.0
Scope and Applicability of Proposed Rule	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Clear Applicability (pages 49066 -49069)

The Department supports the language and definitions (i.e. "New Facility", "Cooling Water Intake Structure") described in items A - E of this section as well as in proposed Sec. 125.81. It is imperative that the applicability of Section 316(b) be unambiguous and straightforward to ensure that State agencies can utilize their resources focusing as to how to minimize impingement and entrainment as opposed to debating as to when Section 316(b) applies.

EPA Response

See the preamble and responses to move specific comments for a description of the definitions and applicability provisions in the final rule. EPA believes the final rule continues to be clear in these respects, so that state agencies may focus their resources appropriately.

Comment ID 316bNFR.054.002

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

The Department does not support continuation of the approach adopted in the 1977 draft guidance which was based on the judgement that "[t]he decision as to best technology available for intake design location, construction and capacity must be made on a case-by-case basis."

EPA Response

EPA agrees that 316(b) issues must not always be considered on a case-by-case basis (see response to comment 316bNFR.068.008). Today's technology-based rule establishes a two-track framework. Should a facility choose the Track I approach, it can implement each of the cited performance-based standards (see 125.84[b]) without consideration of site-specific conditions including assessment of the biological environment. Under the Track II approach, site-specific conditions assessed through biological monitoring can be used to demonstrate performance comparable to that achieved under the Track I requirements (125.84[c]). Thus, under today's rule facilities may choose to implement Track I performance based standards or conduct site-specific biological monitoring under Track II to show comparable performance.

Comment ID 316bNFR.054.003

Author Name	Dennis Hart
Organization	State of New Jersey, Dept. of Environmental Protection

Subject Matter Code 7.1

Definition: New Facility

In Section A entitled "Who is Covered Under This Proposed Rule", the following criteria is stated:

-Your facility is a new facility;
-Your new facility's has a cooling water intake structure or structures;
-Your new facility's cooling water intake structure(s) withdraw(s) water from waters of the U.S. and at least twenty-five percent of the water withdrawn is used for contact or noncontact cooling purposes;
-Your new facility has a design intake flow of greater than two (2) million gallons per day (MGD); and
-Your new facility has an NPDES permit or is required to obtain one.

The Department supports these specific criteria and finds them reasonable in ensuring that new facilities that are likely to have an impact will be addressed.

EPA Response

No response necessary.

Comment ID 316bNFR.054.004

Subject Matter Code	7.21
Request for Comment: Alternative Definition of Cooling Water Intake	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Consideration of Reuse/Recycling

The Department notes that on page 49067 the following is stated

The Agency also invites comment on an alternative where the Agency would define a cooling water intake structure to include intake structures if a facility uses five percent or more of the water drawn through the structure for cooling purposes. This alternative would further ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements of this national regulation. This alternative almost might minimize any potential that the proposed 25 percent threshold would discourage recycling of cooling water, or reuse of cooling water for process needs, by facilities that recycle or reuse cooling water at rates above 25 percent, and might choose to reduced their recycling/reuse rates to avoid meeting the requirements of the proposed rule. For similar reasons, the Agency is considering alternative definitions for a cooling water intake structure based on whether 20 percent, l5 percent, or 10 percent of the intake flow drawn through the structure used for cooling.

The Department supports reuse and recycling of cooling water; however, is concerned that proposing an alternate percentage based on these concerns will complicate the initial issue. As a result, the Department suggests that the definitive threshold of 25% be maintained in final rule and that reuse/recycling alternatives (along with any alternative withdrawal percentages) be treated on a site-specific basis where language be included in final rule stating such.

EPA Response

EPA has retained the twenty-five (25) percent threshold, but removed it from the definition of a cooling water intake structure and placed the threshold in the applicability requirements of the final rule. EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than

twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

In addition, in the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. EPA has amended the proposed definition of cooling water intake structure to specify that, if heated water is needed for a manufacturing process, use of waste heat to heat that process water does not make that process water cooling water. Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. Furthermore, EPA has added guidance to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. This guidance provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further clarifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn equals or exceeds 25 percent of the total water withdrawn.

Comment ID 316bNFR.054.005

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Consideration of Alternative Flow Thresholds

On page 49067 the following is stated, "In addition to a two MGD flow threshold, the Agency is considering higher flow thresholds including 5, 10, 15,20,25 and 30 MGD."

As stated in the previous comment, the Department feels 2 MGD is a reasonable value.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.054.006

Subject Matter Code	7.42
Request for Comment: Higher Threshold for Smaller Withdrawal Percentages	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Flow Threshold for Smaller Waterbodies

On page 49068 the following is stated

In addition to the MGD flow threshold discussed above, EPA is considering whether it should add a flow threshold to address the potential for adverse environmental impact posed by facilities that withdraw less than 2 million gallons of water per day but are located on small water bodies. To provide an additional measure of protection for these water bodies, the Agency might also include facilities that withdraw less than 2 MGD in this rulemaking if they withdraw more than 1% of the mean annual flow of a freshwater river or stream; the mean annual volume of a lake or reservoir; or the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level for an estuary or tidal river.

The Department supports this addition and feels that it will aid in applying section 316(b).

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.054.007

Subject Matter Code	7.5
Applicability to Facilities Subject to NPDES Permit	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Supply of Intake Water to Other Users

On page 49069, the following is stated regarding a situation where one facility might take in cooling water and then transfer it to other new facilities prior to discharge to waters of the United States:

In addition, as in the previous paragraph, the Agency invites comment on a scenario in which the Director would place cooling water intake requirements in the new facility's NPDES permit and in the NPDES permit of the entity that controls the intake to ensure compliance with the cooling water intake requirements proposed today…… Alternatively, the Director could place cooling water intake requirements only in the permit of the facility that operates the structure. This would be administratively simpler and would limit permit requirements to the facility with direct operational control of the structure. The Agency also requests comment on this approach.

In New Jersey, the Department currently regulates existing facilities where the facility with the intake structure supplies water to an adjacent facility (where the adjacent facility does not have an intake structure). In this circumstance, the Department regulates the facility who owns and operates the intake structure and does not pose Section 316(b) requirements in the facility that uses the water that comes through that intake structure. It would be difficult to regulate a facility with section 316(b) conditions if they do not own and operate the intake structure. As such, the Department recommends that EPA propose that Section 3l6(b) requirements be only included for the facility that owns and operates the intake structure.

EPA Response

See response to comment 316NFR.036.003.

Comment ID 316bNFR.054.008

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Definition of Adverse Environmental Impact

On page 49074 the following is stated regarding the definition of adverse environmental impact:

The regulatory language in today's proposed rule does not include a definition of adverse environmental impact. However, the Agency is considering promulgating each of the alternatives discussed below as part of the final regulation and, thus, each should be viewed in a regulatory context. The Agency also might ultimately decide to publish one of these alternatives in guidance that supports the final rule. EPA is also considering taking no action regarding the definition of adverse environmental impact.

The Department notes that EPA then describes four alternative definitions for adverse impact where the third alternative is described as follows:

Under a third alternative EPA is considering, adverse environmental impact would be deemed to occur whenever aquatic organisms are impinged or entrained as a result of the operation of a cooling water intake. Under this alternative, "adverse environmental impact" could be defined as "any impingement or entrainment of aquatic organisms".

The Department strongly recommends that EPA define adverse environmental impact in its final rule. Specifically, the Department feels that this third alternative is the only practical alternative and should be adopted in final rule for Section 316(b) for new facilities. This is the same definition that the Department currently uses in applying Section 316(b) policies for existing facilities. The Department considers the death of any fish at or through a cooling water intake to be an "adverse impact" which must be minimized under Section 316(b). This position makes sense and simplifies an already complex analysis. State Agencies and permitting authorities could engage in a debate for years as to the population measure of a given fish species, let alone many fish species. The results of biological population studies and modeling can be very subjective because it is difficult to identify, measure, and attribute the impact of each of the many variables (what's happening on a coast wide basis, or what's happening with the climate) affecting populations of each of the impacted species. Rather than engage in this kind of biological debate, time and resources would be better spent focusing on the magnitude of the impingement and entrainment losses in relation to the costs and benefits of implementing various technologies to avoid or minimize the impact. This focus is appropriate for section 316(b) which the Departments feels is a technology-driven provision.

EPA Response

Please see response to comment 316bNFR.029.013 for EPA's interpretation of AEI under today's rule.

EPA agrees with the commenter's summary of 316(b) history and issues. EPA shares the commenter's concerns over the uncertainty of population-level studies and modeling efforts as discussed in section VI.B.2.c of the preamble for today's rule. EPA also agrees that the focus of today's rule should be on using the best technology available to minimize AEI.

Comment ID 316bNFR.054.009

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

On page 49075 the following is stated

However, EPA also request comment on adapting the section 316(a) standard for purposes of section 316(b) and defining adverse environmental impact as impacts likely to interfere with the protection and propagation of a balanced indigenous population offish, shellfish, and wildlife."

The Department is very much opposed to EPA adapting the section 316(a) standard for the purposes of section 316(b). As described above, the Department strongly recommends that adverse environmental impact be defined as "any impingement or entrainment of aquatic organisms" or on an individual level as opposed to a population level.

EPA Response

EPA agrees that the CWA does not compel EPA to link 316(b) adverse environmental impact to the objectives of 316(a) of the Act (i.e., balanced indigenous population). EPA believes that the choice by Congress of different terms in section 316(b) versus 316(a) can be presumed to be intentional and purposeful (see response to comment 316bNFR.068.008). Bates v. U.S., 522 U.S. 23 (1997). Please see section VI.B.2.a. of the preamble for the final rule.

Please see response to comment 316bNFR.507.004 and preamble section VI.B.2. for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.054.010

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Specific Language Regarding Location. Design and Capacity

On page 49076 the following is stated

Under the proposed rule, EPA would group water bodies into four categories: (1) freshwater rivers or streams, (2) lakes or reservoirs, (3) tidal rivers or estuaries; and (4) oceans. The agency considers location to be the most important factor in addressing adverse environmental impact caused by cooling water intake structures.

On page 49078 this implementation strategy is continued by stating:

The design and capacity of the intake structure are important factors that affect the velocity or speed at which the water passes through the screen or other barrier at the entrance to the cooling water intake structure. Under today's proposed rule, minimum flow and velocity requirements would be applied based on the actual placement of the cooling water intake structure within the particular water body types Because different water body types have different potential for adverse environmental impact, the requirements proposed to minimize adverse environmental impact would vary by water body type.

The Department agrees that location is the most important factor in minimizing impingement and entrainment issues and supports this location framework. The Department also supports the adoption of specific flow and intake velocity requirements based on the water body types as proposed in Sec. 125.84. Definitive requirements are essential in enabling permitting authorities to guide new facilities as to what intake technologies should be used at their facilities to minimize impingement and entrainment impacts.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody.

Also see response to comment 316bNFR.006.005.

Comment ID 316bNFR.054.011

Author Name	Dennis Hart
Organization	State of New Jersey, Dept. of Environmental Protection

Subject Matter Code 10.01

Regulatory Framework Options

Specific guidelines, as included in the proposed rule, would be a great improvement over the historical case-by-case approach. The Department does not recommend continuation of implementing section 316(b) on a case-by-case, site specific basis as suggested on page 49082.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.054.012

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Comment deleted. Text included in 316bNFR.054.011

EPA Response

No Response Necessary.

Comment ID 316bNFR.054.013

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Dry-Cooling as a Technology

On page 49081, the following is stated regarding dry-cooling:

For example, for the types and sizes of facilities in areas where dry cooling has been employed at facilities in operation, permitted, or slated for construction, the Agency might determine that dry cooling is the best technology available to minimize adverse environmental impact. EPA also invites comment on regulatory approaches of this type based on hybrid wet-dry cooling rather than dry cooling.

Clearly any technology, such as dry-cooling, that requires a zero-intake flow (or nearly zero, extremely low-flow) requirement is the best technology to minimize impingement and entrainment. Given this fact, the Department suggests that the Agency definitively state that dry-cooling is considered to be the best technology where feasible. Even if dry-cooling is not feasible at all locations, a statement that dry-cooling is best technology may encourage facilities to design new facilities with dry-cooling systems. The Agency should also be clear as to what environmental studies, if any, would be required if a dry-cooling system is installed. If studies are not required under a dry- cooling system, this should be clearly stated as it may be an incentive for new facilities to adopt this technology. Advocacy of this technology over other technologies may aid in advancing the technology and, eventual installment of such, would surely minimize impingement/entrainment impacts.

EPA Response

EPA has not adopted dry cooling as the technology basis for the requirements in the final rule. See Section V.C of the final rule for a discussion of the reasons behind EPA's decision.

Although EPA has rejected dry cooling technology as a national requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas).

By adopting the two-track approach in the final rule for new facilities, EPA has developed a framework that will allow for expedited permitting of "new facilities." This would not be the likely outcome of a rule that specified that dry cooling must be determined to be "feasible." Of course, if a facility were to adopt dry cooling, it would meet the requirements of Track I and qualify for expedited permitting.

Comment ID 316bNFR.054.014

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Tiered Approach to Adverse Environmental Impact

On page 49082 the following is stated:

Some stakeholders have suggested an alternative regulatory framework in which section 3l6(b) implementation is accomplished through site-specific examination of the risk of adverse environmental impact and (assuming the cooling water intake poses some reasonable risk of adverse environmental impact) site-specific evaluation of potential BTA technologies. Under one approach, the framework of the site-specific alternative would consist of three tiers. In Tiers 1 and 2, the facility, in consultation with the Director, would assess the potential for risk of adverse environmental impact associated with the proposed cooling water intake structure. Tier 1 would be both a screening and an assessment tier that relies on existing information that is site-specific or relevant to the adverse environmental impact determination. Tier 2 would focus on collection and analysis of additional information collection activities, as necessary, to make the adverse environmental impact determination. In Tier 3, which would assume that the Director has found that the cooling water intake structure is reasonably likely to pose risk of adverse environmental impact, the facility would assess BTA alternatives, including an evaluation of costs and benefits.

As discussed in a previous comment, the Department strongly recommends that the agency define adverse environmental impact in final rule as occurring whenever there are any impingement and/or entrainment effects. Given the above discussion, this position greatly simplifies this very complex three tiered analysis. In adopting such a position and considering the above discussion, the permitting agency could skip right to Tier 3 and focus its efforts on available technologies rather than debating about the very subjective determination of adverse environmental impact. This suggested technology- based approach would allow the permitting authority to consider the most protective technology to minimize impacts and compare the cost of the option to the environmental benefits which will be gained by its implementation. If the cost of the most protective option is not wholly disproportionate to the expected environmental benefits, then that option is required under the permit as BTA. But if the cost of minimization is considerable (wholly disproportionate) to the expected benefits, it is rejected and the same analysis is then applied to the next protective option. This process would continue until there is an option that can be required at a cost that is reasonable compared to the level of minimization to be expected. Agencies could spend years in circuitous debate on Tiers 1 and 2.

EPA Response

See response to 316bNFR.034.007. EPA has discussed AEI in the preamble to the final rule and indicated that it can include, but is not limited to, impingement and entrainment of fish and shellfish. See Sections III and VI.B of the preamble to the final rule.

Comment ID 316bNFR.054.015

Subject Matter Code	12.4
Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Wet- Cooling, Closed-Cycle Recirculating System

On page 49087, the following is stated:

Today's proposal would require that the intake flow withdrawn by a cooling water intake structure be reduced to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system by all cooling water intake structures at the facility…….. In addition, EPA cost estimates show that this requirement is available to new facilities on a national level

Given that closed-cycle cooling is an available technology, the Department suggests that the Agency mandate this specific technology by calling it "best technology available" for facilities that will be located in estuaries and tidal rivers of the Littoral Zone. Additional technologies may need to be applied at the intake to ensure that impingement and entrainment is minimized to the best extent practicable. The Agency should also be clear as to what environmental studies, would be required if a closed- cycle cooling system is installed. If studies are either not required or a lesser amount is required for a wet closed-cycle cooling system, this should be clearly stated. A lesser amount or lesser amount of complexity for scientific studies may be an incentive for new facilities to adopt this technology. If wet closed-cycle cooling systems are considered infeasible or the costs are wholly disproportionate to the benefits based on site-specific considerations, the facility would bear the burden of proof for alternate intake protection technologies.

EPA Response

While EPA has not met the commenter's suggestion of mandating closed-cycle cooling in all or some waterbodies, the final rule does contain technology-based performance requirements based on closed-cycle recirculating cooling for Track I and an equivalent requirement for entrainment reductions through Track II. While EPA does not mandate the use of any technology in the final rule, the Agency recognizes that flow reduction is a key means for reducing entrainment and mortality of organisms. As such, in EPA's view, the benefits of entrainment reduction will be achieved for all water bodies through the final rule.

In the final rule, EPA also includes technology-based performance requirements for intake technologies designed to reduce impingement of organisms and enhance the survival of impinged organisms. The requirement for through-screen, design velocity no greater than 0.5 ft/s serves to reduce impingement of organisms in all water bodies (see Section V of the preamble to the final rule). The requirements for design and construction technologies will reduce impingement further and enhance the survival of impinged organisms (see Section V of the preamble to the final rule). Therefore, through the flow reduction (i.e., entrainment reducing) requirements outlined above and the impingement controls described in this paragraph, the commenter's recommendations for the

minimization of impingement and entrainment to the best extent practicable have been adopted.

For the final rule, the Agency has clarified those environmental studies (if any) that are required for each compliance track of the rule. For Track I -- the fast track, where new facilities agree to adopt closed-cycle recirculating cooling systems, meet the velocity requirements, install design and construction technologies, conduct post-operational monitoring, and meet proportional flow requirements based on water body sizes -- the final rule does not require pre-operational environmental studies. For Track II -- the demonstration track, where new facilities conduct a comprehensive demonstration study to determine alternative technology suites and siting options to reduce entrainment and impingement to the same level as that obtain in Track I -- the final rule requires pre-operational demonstration studies. In some cases, the comprehensive demonstration study in Track II will involve biological monitoring, where existing data meeting minimum quality criteria are not available. See Section V of the preamble to the final rule. As such, EPA has clearly defined the environmental studies necessary for compliance with the final rule. In addition, the preamble to the final rule, the Final Technical Development Document, and the Compliance Guide all contain plain language instructions for facilities to understand the environmental study requirements of the rule.

EPA disagrees with the recommendation by the commenter that scientific studies be used as an incentive for new facilities to adopt technologies. EPA concludes that scientific studies should be conducted where necessary to benefit the permittee and permitting authority. For Track II -- the alternative compliance option requiring pre-operation studies -- EPA included the comprehensive demonstration study requirements for the sole purpose that they would serve as the basis for the site-specific decision as to the best technology to reduce entrainment and impingement to the same degree as the demonstrated Track I technology-based performance requirements. EPA does not view demonstration studies as an incentive or a disincentive for adoption of closed-cycle cooling. In fact, EPA concludes that facilities will choose the least expensive option for compliance, and this may not be closed-cycle cooling for some situations. While it is true that under Track II the burden of proof is upon the permittee, the benefits of the compliance options will be identical between Track II and Track I. Therefore, while EPA views closed-cycle recirculating cooling systems to be part of the best technology available based performance requirements of the final rule, the Track II compliance option provides facilities an option to demonstrate alternative means of reducing entrainment that maintains the performance and benefits of this widely used and available technology.

Comment ID 316bNFR.054.016

Subject Matter Code	15.1
Request for Comment:	*Role of Restoration*

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Restoration Measures

On page 49089 the following is stated

Given the limits on the ability of direct control technologies (location, flow, velocity, and other requirements) to eliminate environmental harm in all circumstances, EPA is considering a variety of mandatory, discretionary and voluntary regulatory approaches involving restoration measures. On the other hand, EPA also is considering specifying that restoration measures may not be part of a Section 316(b) determination. EPA invites comment on the appropriate role of restoration, i[f] any, under section 316(b).

First and foremost, the Department considers Section 316(b) to be a technology driven provision. Any technology for which the costs are not wholly disproportionate to the benefits must be required for new cooling water intake structures. As described previously, the Department recommends that final 316(b) rule include language to state that dry-cooling closed-cycle recirculating systems are the first choice to minimize impingement/entrainment impacts thereby being the best technology. As a second choice, the Department recommends that language be included in the final rule stating that wet cooling closed-cycle recirculating systems are the best technology available since they are an available technology that is effective in minimizing intake water flows and hence impingement/entrainment impacts. The cooling water intake structures for facilities with wet-cooling closed-cycle recirculating systems must still be equipped with technology to minimize impingement/entrainment to the best extent practicable.

In the event that dry-cooling closed-cycle recirculating systems are not feasible and wet-cooling closed-cycle cooling recirculating systems are installed, the Department supports mitigation measures to further mitigate impingement/entrainment losses. There is no debate that wetlands aid in producing fish and therefore help mitigate the effects of a facility's impingement and entrainment numbers. This is especially important since shrinking open space and lost wetlands have become a critical environmental issue. The Department supports the inclusion of restoration measures as part of section 316(b) rules. However, this support is conditional on the premise that all technological options are carefully considered first and mitigation shall not be required as a substitute for technology.

Given the previous recommendation by the Department that cooling towers should be recognized as best technology available, the Department suggests that language be included in final rule to state that mitigation measures are mandatory if it is determined that cooling towers can not be installed for whatever site-specific reasons. The Department also suggests that language be included in the final rule to state that mitigation measures are always encouraged and recognized as reducing impingement/entrainment impacts on a waterbody for the purposes of section 316(b). If a permitting agency determines that mitigation measures will be part of the section 316(b) determination, these measures must be specifically required in that facility, s NPDES permit.

EPA Response

EPA agrees with a technology-based approach for section 316(b) of the Clean Water Act decisions for new facilities and today's rule reflects that. In section VIII of today's preamble. EPA has moved away from the wholly disproportionate cost test to the "cost to revenue" economically practical test for the reasons discussed in the preamble and 316bNFR.206.014. EPA discusses in detail economic issues including alternative requirements when costs are wholly out of proportion to the costs EPA considered in establishing the requirements at issue. In section V.C of today's preamble, EPA discusses in detail why it is not adopting dry cooling as best technology available for minimizing adverse environmental impacts.

EPA is including restoration measures in Track II to the extent that the Director determines that the measures taken will increase the fish and shellfish in the waterbody in a manner that represents performance comparable to that achieved in Track I. Applicants in Track II are not required to undertake restoration measures, but may choose to do so. Therefore, under today's rule, as long as these restoration measures achieve performance comparable to that achieved under Track I requirements, they may be employed. See preamble sections V.B.2.f and VI.L for discussions on the basis and role of restoration measures in Track II. Although EPA has not required mitigation in addition to the Track I requirements, in order to provide for "fast" track permitting, states may always be more stringent under section 510 and the rule so provides.

Comment ID 316bNFR.054.017

Subject Matter Code	16.1
Discretionary Options Available to the Director	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Timing Issues for Alternate BTA Requirements

On page 49091 the following is stated

Proposed Sec. 125.85 would allow the Director, in the permit development process, to set alternative BTA requirements that are less stringent than the nationally applicable requirements Proposed Sec. 125.85(a)(2) provides that alternative requirements that are less stringent than the requirements of Sec. 125.84 would be approved only if compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during development of the requirement at issue, the request is made in accordance with 40 CFR part 124, the alternative requirement requested is no less signet than necessary, and the alternative requirement will ensure compliance with sections 208(e) and 301(b)(I)(C) of the Clean Water Act.

The Department appreciates that flexibility is being given to the permitting authorities as discussed in this proposed section. However, it is critical that the timing element be also addressed in this section. If a facility has determined that the conditions in Sec. 125.84 can not be met and the facility seeks approval under this alternate language in Sec. 125.85, it is critical that the facility consult with the permitting agency and submit a demonstration as to why the conditions in Sec. 125.84 can not be met. If this demonstration is accepted by the permitting authority, a pre-determination can be issued and the facility can move on to completing the requirements described in Sec. 125.85. This will enable the permitting authority to render a decision regarding the feasibility of approval under Sec. 125.85 before extensive time and resources are committed by the facility, in designing and completing the requirements in Sec. 125.86, as well as before extensive review time and resources are committed by the permitting authority.

EPA Response

EPA agrees with the commenter that making the determination under today's final rule section 125.85, the alternative requirements section, as early in the process as possible is the best approach for the permittee. EPA points out that the determination if compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during development of the requirement will be made by the Administrator and not the state or permit authority Director. For further discussion on alternative requirements, see preamble section VII.H.

Comment ID 316bNFR.054.018

Subject Matter Code	18.1
Elimination of "Wholly Disproportionate" Cost Test	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Use of Wholly Disproportionate Cost Test

On page 49094 the following is stated

Under the wholly disproportionate cost test, a cooling water intake structure technology would not be deemed to reflect BTA if the incremental costs of requiring the use of that technology are wholly disproportionate to the environmental benefits to be gained through its use. Several section 316(b) administrative decisions have stated that this test is the most appropriate for determining economic burden.

The Department currently uses the wholly disproportionate test in applying section 316(b) to its existing facilities and supports the use of this useful test. However, the Department strongly recommends that EPA offer some guidance as to its intent regarding the term "wholly disproportionate" where a specific ratio or range of ratios should be defined. In the Department's experience, industries view "wholly disproportionate" as meaning a ratio of 1: 1 costs versus benefits where, if costs do not equal benefits, the technology does not pass the test. Clearly, the Department does not agree that 1: 1 is "wholly disproportionate". Additional guidance on this term is essential.

EPA Response

EPA has considered the issues raised in the comment. For technology based rules such as the final section 316(b) New Facility Rule, EPA believes that the economic practicability test, not the wholly disproportionate test, is most appropriate for BTA determination. See response to comment 316bNFR.206.014. For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. As such, EPA has determined that for new facilities, the guidance requested by the commenter is not required.

For further information on EPA's position on use of the "wholly disproportionate" test for BTA determination, see EPA's response to comment 316bNFR.052.009 above.

Comment ID 316bNFR.054.019

Subject Matter Code	19.0
Implementation	

Author Name Dennis Hart

Organization State of New Jersey, Dept. of Environmental Protection

Clear Implementation Requirements

On page 49096 the following is stated:

Under the proposed rule, section 316(b) requirements would be implemented in an NPDES permit. The regulations would establish application, monitoring, recordkeeping,, and reporting requirements for new facilities. The proposed rule would also include requirements for Directors in developing NPDES permits for new facilities. The proposed rule states that the Director, at a minimum, must include in the permit the cooling water intake structure requirements at Sec. 125.84, monitoring conditions at Sec. 1:25.87, and recordkeeping and reporting requirements at Sec. 125.88.

The Department supports the clear language included in the preamble as well as in the proposed sections. This information will be very helpful in guiding permitting authorities as well as applicants in implementing section 316(b) for new facilities.

EPA Response

Commenter supports proposal. No response necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

David K. Gordon

On Behalf Of:

Riverkeeper

Author ID Number:

316bNFR.055

Note

No comments coded for this letter, as it was replaced by later submissions. Riverkeeper comments are coded under 316bNFR206.. The attachment from Pisces Conservation is available as 316bNFR032_Pisces and Tellus as 316bNFR032_Tellus.

Comment ID 316bNFR.055.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name David K. Gordon

Organization Riverkeeper

No comments coded for this letter, as it was replaced by later submissions. Riverkeeper comments are coded under 316bNFR.206.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kent Zammit

On Behalf Of:

Electric Power Research Institute (EPRI)

Author ID Number:

316bNFR.056

Comment ID 316bNFR.056.001

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code CP

Comment Period

EPRI would like to note that we were disappointed that EPA did not extend the comment period beyond 90 days as we informally requested and as other stakeholders had formally requested. EPA's proposed rule is extensive and, more importantly, EPA requests an extensive number of comments on proposed facets of the rule. EPRI has a number of research projects that will generate valuable information for the rules development. Many of these reports were due to EPRI for peer review early this fall for publication (and delivery to EPA) by the end of the year. Because EPA did not further extend the comment period, we have had to simultaneously manage the peer-review process and prepare our technical comments on the proposed rule. Furthermore, the full implications of our 2000 research efforts relative to EPA's proposed rule, could not be thoroughly assessed and documented.

EPA Response

EPA agrees that the § 316(b) new facility rule raises a number of complex issues. Consistent with the Administrative Procedure Act and Executive Order 12886, the Office of Water (OW) generally provides for a 60-day period for public comment on proposed rules. In some cases in which a regulation is projected to affect a very large number of facilities or impose very substantial costs, OW provides for a 90-day comment period. In only a few instances does OW extend comment periods beyond 90 days. Our record for the new facility proposal indicates that the number of facilities that would be affected by the proposal is limited. Based on the low projected annual costs and small number of facilities we project would be affected by the new facility rule, EPA believed that 90 days was sufficient to provide a meaningful opportunity for public comment on the proposal. Further, EPA provided an additional public comment period on the Notice of Data Availability.

Comment ID 316bNFR.056.002

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Failure to define adverse environmental impact (AEI) is a fundamental flaw of the rule. If there is no defined AEI, it would be impossible to determine appropriate BTA requirements. All of the scientific elements of the rule are dependent upon this definition and until it is defined, all comments on specific elements are secondary and of limited value. As we discuss below, we recommend that AEI be based on population and community-level impacts that are measurable and of consequence to water resource management. Furthermore, we submit that any definition more conservative than this (e.g., impingement and entrainment, 1 percent of standing population. impingement and entrainment that is recurring and nontrivial) lacks a scientific foundation and may unnecessarily burden the general public and private industry with actions that provide an unknown environmental benefit.

EPA Response

EPA has interpreted AEI in this rulemaking (please see response to comment 316bNFR.507.004 and section VI.B of the preamble to today's rule). EPA notes that a technology-based approach does not require EPA to demonstrate receiving water quality benefits (see response to comment 316bNFR.068.008).

Comment ID 316bNFR.056.003

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

The degradation in quality of our nations water resources became obvious during the middle portion of the 20th century ultimately leading, via the Clean Water Act (CWA) of 1973, toward national action for measures to restore and protect its quality. As part of the development of that act, the population and community consequences of impingement and entrainment mortality of extremely large numbers of aquatic organisms by cooling water intake structures (CWIS) was a valid concern. At that time, scientific information on methods to assess the impacts and the actual population and community consequences was extremely limited. Intense national study on the issue and role promulgation by EPA all concluded that site-specific analysis was the most effective approach to determine the best technology available (BTA) for minimizing potential adverse environmental impact (AEI). Although the EPA roles were set aside based on legal procedural issues, the site-specific approach has generally been followed in meeting the CWA requirements.

EPA Response

See response to comment 316bNFR.008.007, 316bNFR.068.007, 316bNFR.068.008 and the preamble to today's rule. EPA believes that a technology-based approach was contemplated by Congress in establishing § 316(b) and that there is ample legislative history that supports that new facilities should achieve the highest level of technology performance.

Comment ID 316bNFR.056.004

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Nearly 25 years has passed since promulgation of the original rule. During this period, extensive empirical scientific information has developed providing today's assessment scientists with a wealth of information beyond the expectations of the scientists who labored during the 1970s. This data base of information provides EPA, unlike during the 1970s, with an opportunity to develop a scientifically sound rule for new facilities (and a proposed rule for existing facilities in the near future). This effort should involve defining the problem that exists (as recommended below) and proposing a regulation that will fix that problem, where it exists. As we discuss below, for various reasons the problem has not been defined in a context of aquatic resource impacts and the necessary actions required to eliminate or reduce those impacts where they exist. Much like in the 1970s, the focus of EPA's proposed rule remain on reducing or eliminating impingement and entrainment of organisms whether or not these processes result in environmental consequences. This focus indicates that EPA has made limited use of the store of scientific information that has developed since the 1970s.

EPA Response

EPA has reviewed and considered scientific information that has been developed since the 1970s. EPA has defined the problem that exists and has established national technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities for minimizing adverse environmental impact associated with the use of these structures. EPA's record supports that the final rule is scientifically based, technically sound, protective of aquatic resources, and technically available and economically practicable. Please see response to 316bNFR.009.001 and the preamble to the final rule.

Comment ID 316bNFR.056.005

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

The extremely conservative nature of the rule implies that there is a severe national problem from the impingement and entrainment of aquatic organisms by cooling water intake structures (CWIS); however, EPA fails to support this case with a national assessment of the extent and nature of the problem. In its preamble, EPA does note some potential problems at a few, high-profile power plants. For these specific plants, however, EPA notes outdated information and furthermore fails to note that impacts remain technically debatable. Regarding this comment, the following key points are noted:

EPRI and some of the best fishery scientists in the world have never identified a site where definitive or conclusive aquatic population or community level impacts have occurred from operation of CWIS, as suggested by EPA in its' Engineering and Economic Analysis. EPRI is planning in 2001 to conduct a survey of the methods and findings used in prior 316(b) investigations to provide a scientific assessment of the nature of 316(b) impacts. We do, however, recognize that at a few sites, potential impacts remain unresolved and require further investigation. We also recognize the potential for cumulative impacts from CWIS operations; however, there is no obvious evidence that cumulative impacts are of major concern and warrant overly conservative national performance standards to prevent them.

EPA, in its own biannual report to Congress on the quality of our nation's water, has never identified cooling water intake structures as a source of water quality impairment. Searches of the 1998 Report to Congress, specifically the Executive Summary, Chapter 3 (Streams and Rivers), Chapter 4 (Lakes and Reservoirs), Chapter 5 (Coastal Resources including Estuaries and Coastal Oceans), and Chapter 8 (Aquatic Life Concerns) for the key words cooling water intake structure, impingement, entrainment and water withdrawals are not found. It is apparent, therefore, that the states do not consider CWIS operation as a water quality or aquatic life impairment of concern.

EPA Response

EPA disagrees that the rule is extremely conservative and notes that the commenter does not explain what is meant by this phrase. EPA believes that it should establish new facility performance standards based on the best available performance standards based on the best technology available, economically practicable, demonstrated control technology. New facilities have the opportunity to install the best and most efficient cooling water intake structures to minimize adverse environmental impact. EPA believes it is reasonable to interpret section 316(b) for new facilities in a manner similar to section 306 for new sources, that is to say that congress directed EPA to consider the best demonstrated controls that minimize effects from cooling water intake structures to the maximum extent that is economically practicable.

EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. Further, stresses on populations and communities related to cooling water intakes may not manifest

immediately. EPA agrees with fisheries experts and resource managers that there is unavoidable uncertainty associated with managing fish populations and notes that NMFS, despite the availability of state-of-the-art fish population models and considerable experience managing fisheries has classified 34 percent of their managed fishery stocks as over-utilized. As recently expressed by a NMFS advisory panel "uncertainty and indeterminancy are fundamental characteristics of the dynamics of complex systems. Predicting the behaviors of these systems cannot be done with absolute certainty, regardless of the scientific effort invested." EPA agrees with the conclusion of the NMFS panel that "[G]iven the high variability associated with ecosystems, managers should be cognizant of the high likelihood for unanticipated outcomes. Management should acknowledge and account for this uncertainty by developing risk-averse management strategies that are flexible and adaptive." Additionally, EPA analyses suggest that more than 99 percent of surveyed existing cooling water withdrawal facilities are located within 2 miles of waters that are identified as impaired and listed by a State of Tribe as needing development of a total maximum daily load (TMDL). This suggests that cooling water intakes may be a contributing factor to existing stresses on water bodies and resident biota.

EPA is also concerned that extensive data sets, encompassing 20 or more years of data, may be required to adequately assess whether or not populations are being affected by intakes. Under such circumstances, and given the economic practicability of the rule for new facilities, a precautionary approach is warranted. EPA would note that New York state, which has developed extensive data sets for the Hudson River, believes that cooling water intakes are having an adverse environmental impact on that body of water.

Finally, both the National Marine Fisheries Service and the Atlantic States Marine Fisheries Commission have expressed concerns about cooling water intake impacts on fishery stocks. EPA believes that cooling water intakes do pose a threat to some fishery stocks, and because EPA's mission includes ensuring the sustainability of communities and ecosystems, EPA must comprehensively evaluate all potential threats to resources and through this rule, minimize such threats. See sections III and VI.B of the preamble for additional discussion of these issues.

Comment ID 316bNFR.056.006

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPA has identified estuaries as being particularly sensitive to the effects of CWIS operations; however, EPA has failed to note the conclusions of the Maryland Power Plant Research Program (M-PPRP) regards impacts of CWIS operations on the bay resources. M-PPRP is the longest running, most comprehensive power plant research program in the U.S. and the Chesapeake Bay, the largest estuary in the U.S., is world renown as an estuary that historically yielded large harvests of a wide variety of fish and shellfish. Thirteen power plants, withdrawing and discharging 8 billion gallons per day of the Bay's waters for cooling purposes, are located on the mainstem of the Bay. M-PPRP concluded as a result 25 years of study "...that while operations of individual power plants impact various ecosystem elements in various ways, those impacts, taken together, have had no identifiable substantive cumulative impact on Maryland's aquatic resources to date" (M-PPRP 1999 and Richkus and McLean 2000 in Dixon et al. 2000).

These results are significant relative to EPA's proposed 2-MGD design flow rate for new facilities that will be subject to the regulation. The thirteen power plants on the mainstem of the Chesapeake Bay withdraw a total of 8 billion gallons per day of cooling water. The average plant withdrawal of 615 MGD per plant (range of ~50 to 3,500 MGD) contrasts strongly to the 2 MGD proposed by EPA.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.056.007

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Despite the operation of five power plants in the lower Hudson River. NY .the catch-per-unit-of-effort of age 6-8 striped bass has increased by more than a factor of 10 since the early 1980s. Furthermore, it has recently been concluded that as a result of more than 25 years of research, "There is no evidence that any of the species that have been investigated have suffered long-term declines. To the contrary, many species may have benefited from continued improvements in water quality and reduction in fishing pressure (Barnthouse 2000 in Dixon et al. 2000)."

In 1996, in preparation for the impending relicensing of nuclear power plants in the U.S., the U.S. Nuclear Regulatory Commission (NRC) published the results of a multi-year study of the generic environmental impacts (NRC 1996). The NRC study explicitly examined the impacts of impingement and entrainment at nuclear plants with once-through cooling water operations. The following are key conclusions of that effort:

"Although significant adverse entrainment effects have not been demonstrated at most facilities, the entrainment of fish and shellfish in early life stages remains an issue at some nuclear plants with once-through cooling systems."

"The impacts of fish and shellfish entrainment are small at many plants, but they may be moderate or even large at "few plants with once-through cooling systems."

"As with entrainment, operational monitoring and mitigative measures have allayed concerns about population-level effects at most plants, but impingement mortality continues to be an issue at others."

"The impacts of impingement are small at many plants but may be moderate or even large at "few plants with once-through cooling systems."

NRC did not reference any specific population-level impact with regards to plants where impingement and entrainment remains an issue or a concern; in fact, where issues or concerns remain, they were based solely on the subjective opinions of state regulators and resource agencies. The NRC concluded due to unresolved impingement and entrainment issues at some plants that this issue should be dealt with on a site-specific basis during plant relicensing.

EPA Response

EPA would note that the data presented on the Hudson River can be interpreted to mean that fish populations are improving due to the efforts of other programs such as those which have reduced nutrient and toxics loadings, despite the documented mortality related to the operation of cooling water intakes. Also, the commenter correctly points out that NRC recognizes that once-through cooling systems present a risk to fish and shellfish. Further, the conclusion by NRC, an agency whose expertise is regulation of nuclear power plants, that impacts on aquatic resources from the operation of

cooling water intakes should be dealt with on a case-by-case basis, is not binding on EPA, the federal agency specifically tasked with implementing section 316(b). Also, see the Response to Comment 316bNFR.056.005 and 316bNFR.068.052 for additional discussion of issues raised in this comment.

Comment ID 316bNFR.056.008

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 7.4

Water Withdrawal threshold

Using the NRC database of nuclear plants with once-through cooling. EPRI calculated the average and range of water withdrawal rates for comparison to EPA's proposed design flow rate for new facilities that will be subject to the rules requirements. The NRC database includes 42 nuclear plants with 67 operating units that employ once-through cooling. The average withdrawal per unit is 903 MGD (range of 71 MGD to 1,728 MGD). More importantly, the average withdrawal per water body (i.e., where more than one unit withdraws from a single water body) is 1,140 MGD (range of 71 MGD to 3,456 MGD)(EPRI's database for this analysis is attached). These withdrawals contrast strongly with EPA's proposed criteria of 2 MGD, suggesting that EPA's criteria is overly conservative.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

The comment suggests that the data represents existing facilities. This rule applies to new facilities only. Existing facilities will be addressed under Phase II and III. The comment also indicates these existing plants have once-through cooling. EPA believes the trend for (recent and) new facilities is towards recirculating systems, which require significantly less cooling water.

Comment ID 316bNFR.056.009

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

The extremely conservative nature of the rule implies that EPA remains focused on the large numbers of aquatic organisms that are impinged and entrained by CWIS. However, the failure to clearly demonstrate the problem with a national assessment of impacts (i.e., a definitive assessment of population and community-level effects) indicates that EPA has not considered the natural dependent-dependent processes (compensation) that mitigate loss of individuals (numbers). A complete discussion of density-dependence (compensation) can be found in one of our reference documents submitted with these comments (Rose et al. 2000). Dr. Ken Rose of Louisiana State University, with a team of national fisheries experts, at EPRI's request, performed a comprehensive review of this issue. Their results are presented in the technical manuscript titled "Compensatory Density-Dependence in Fish Populations: Importance, Controversy, Understanding, and Prognosis". The draft manuscript has been submitted to the Journal of Fish and Fisheries for publication in 2001. This is a detailed paper with extensive information; however, the team's key conclusion is as follows: "Compensation must be included in management analyses that involve long-term predictions of fish populations... We also know how to incorporate density-dependence into population dynamics and stock assessment models."

EPRI cannot emphasize enough the importance of fish life history strategies (the reproductive and growth processes that have evolved to insure survival of a species) and density-dependent mortality to understanding the potential impacts of CWIS and appropriate approaches to mitigate them where they exist. In fact, life history strategy can be an effective framework for identifying protection needs and the appropriate technology to attain it. Toward this, we submit with our comments three key papers for EPA's review in addition to the review paper by Rose et al. (2000) noted above. These papers include: (1) Winemiller and Rose 1992 –"Patterns of Life History Diversification in North American Fishes: Implications for Population Regulation"; (2) Winemiller and Rose 1993 -"Why Do Most Fish Produce So Many Tiny Offspring?"; and (3) Chambers and Leggett -"Maternal Influences on Variation in Egg - Sizes in Temperate Marine Fishes". For example, striped bass are considered a periodic strategist; i.e., species that delay maturation in order to attain a size sufficient for production of a large clutch and adult survival during periods of sub-optimal environmental conditions. These species are generally marine (like striped bass) and cope with large-scale spatial heterogeneity of the marine pelagic environment by producing huge numbers of tiny offspring, at least some of which are bound to thrive once they encounter favorable areas or patches within zones and strata. On average, larval survivorship is extremely low among highly fecund fishes in the marine environment. Relative to striped bass, Winemiller and Rose (1992) note that during most years larval survivorship approaches zero for most females. From the standpoint of an individual female, it is likely that the fitness payoff only comes during one or two spawning acts over a course of a normal life span (~15 years). Therefore, there may be little benefit in attempting to minimize larval mortality (e.g., via EPA's proposed flow reductions and siting of intakes). As Winemiller and Rose (1992) note, for this type of strategist, management should be targeted at maintenance of some critical density of adult stocks and the protection of spawners and spawning habitats. Within this life history context it can be technically argued that entrainment mortality of striped bass eggs, larvae and juveniles may actually increase natural survivorship by reducing densities and intra-specific competition for limited resources. Dr.

Brian Rothschild of the University of Massachusetts attempted to make this point during the 1998 EPA Public Meetings; unfortunately there was insufficient time for him to defend his position and discuss the point. We realize this applies to one species, however, similar arguments can be made for other periodic strategists that are commonly impinged and entrained at CWIS.

In contrast to periodic strategists are those classified as opportunistic. This strategy in fishes appears to place a premium on early maturation, frequent reproduction over an extended spawning season, rapid larval growth, and rapid population turnover rates, all leading to a large intrinsic rate of population increase. Small fishes with early maturation, small eggs, small clutches (yet high relative reproductive effort), and continuous spawning are well equipped to repopulate habitats following disturbances or in the face of continuous high mortality in the adult stage (Winemiller and Rose 1992). This suite of life-history traits permits efficient recolonization of habitats over small spatial scales. Examples of the opportunistic strategy, including those commonly impinged and entrained by CWIS are the bay anchovy and silversides. These small fishes maintain dense populations (which is why they appear at the top of the numbers chart for impingement and entrainment by CWIS in estuarine systems) in marginal habitats and frequently experience high predation mortality during the adult stage. For comparison, opportunistic plants are generally referred to as weeds. Roaches are an example of opportunistic insects.

An understanding of life history strategies, particularly for periodic and opportunistic species (which are the most common species impinged and entrained by CWIS) can explain why the drastic population reductions predicted by many models have not materialized and, more generally, why we apparently do not have a national problem associated with operation of CWIS. Furthermore, because location is so important in determining environmental impacts (i.e., location determines the species vulnerable to impingement and entrainment) and because different species have different life-history strategies, the site-specific approach to CWIS siting and impact assessment should be continued or further refined.

EPA Response

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

EPA agrees with the commenter that a comprehensive understanding of fish (and shellfish) life history strategies is important when evaluating impingement and entrainment impacts. The commenter provides a great deal of detailed life history strategy information for one anadromous fish species (striped bass). The papers submitted by the commenter expand on this information, providing life history strategy information primarily for temperate marine fish species. However, EPA believes that insufficient knowledge of life history strategies exists for all species (temperate, tropical, forage, and

predator) located in all waterbodies (freshwater streams, lakes/reservoirs, estuaries, and nearshore marine coastal areas) at which intakes may be sited.

EPA is concerned by the commenter's discussion of opportunistic species that are purported to be "the most common species impinged and entrained by CWIS." In referring to these species as similar to weeds or roaches, the commenter appears to be seeking to minimize their importance. EPA does not concur with this assessment, but rather places considerable value on opportunistic forage species that serve as important components of aquatic food chains. Today's rule seeks to minimize entrainment and impingement losses for all fish and shellfish species.

Finally, EPA disagrees that minimization of AEI can only be achieved on a site-specific basis at new facilities. However, EPA believes that the two-track technology-based framework described in today's rule does provide new facilities with the flexibility to recognize site-specific factors while meeting performance-based requirements. Thus, under today's rule facilities may choose to implement Track I performance based standards or conduct site-specific biological monitoring under Track II to show comparable minimization of entrainment and impingement.

Comment ID 316bNFR.056.010

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPA's delineation of sensitive areas is scientifically flawed, particularly its use of the 'littoral zone' concept. First, EPA states that shorebound species are those most vulnerable to impingement and entrainment. In fact, it is the organisms with pelagic life stages (eggs, larvae, juveniles and adults) that are most vulnerable to potential impingement and entrainment impacts. Pelagic life stages occur throughout the surface layer of all water body types. Furthermore, EPA presents no scientific analysis to demonstrate that existing intakes in, or within 50 meters of, EPA's arbitrary definition of 'littoral zone' have significantly higher impingement and entrainment rates than intakes currently located 50 meters beyond the "zone." More important than vulnerability (as EPA documents with numbers of impinged and entrained aquatic organisms) is the impact (as measured with population or community-level consequences) that occurs. As noted above, EPA has not demonstrated that such impacts occur for freshwater streams, rivers, reservoirs, and lakes.

The 'littoral zone' concept is untenable. The concept has various 'definitions' in different ecological disciplines and for different water body types. Many graduate school ecological texts do not even mention the term and when they do, it is a generalization of having something to do with the shoreline. More importantly, EPA's attempt to define it using the parameters of light penetration, slope, and substrate is not possible because each of the terms is highly variable, particularly light penetration. Light penetration is dependent upon the presence of dissolved and particulate suspended matter, which is in turn dependent upon physical and biological processes that cause the suspension. These processes vary on an hourly, daily, monthly and annual basis. Therefore, there is no specific point at which the littoral zone ends or that 50 meters can be measured from (furthermore, 50 meters is an arbitrary distance not supported by any form of scientific analysis). Similarly, slope and substrate transition occurs in a gradient. EPA offers no specific guidance or definition where in the gradient the point of 'zone' change occurs. EPA's intent to use the 'littoral zone' concept as the delineation of sensitive areas will only lead to unending regulatory and scientific debate with no hopeful expectation of resolution or implementation. EPRI strongly recommends that the 'littoral zone' concept be abandoned.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.056.011

Author Name Kent Zammit

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The extremely conservative nature of the rule forces the use of wet- and, possibly dry cooling processes at new facilities. These processes have their own potential environmental impacts. Wet cooling has potential environmental problems associated with particulate (including salt) drift and biocide use and discharge, as well as human impact issues of noise and visual aesthetics. Dry-cooling has impingement and entrainment issues of their own, albeit another media -- i.e.; impingement and entrainment of airborne organisms, predominantly insects. These potential impacts are not explored or analyzed in the propose rule. A detailed scrutiny may also reveal additional unforeseen impacts.

EPA Response

EPA disagrees that the rule is "extremely conservative." EPA notes that the commenter does not explain what is meant by this phrase. Therefore, EPA cannot act further on this portion of the comment.

For a discussion of the environmental impacts of wet cooling towers see response to comment 316bNFR.068.100.

EPA notes that the commenter provides no data or references to support this statement that dry cooling technologies may potentially have impingement and entrainment issues with airborne insects. EPA was unable to locate any research on the subject. However, an analogous situation may be for birds colliding with wet cooling towers, which has been researched extensively. See response to comment 316bNFR.068.100. The conclusion reached in research on bird collisions with natural draft cooling towers is that the issue is not significant. Therefore, EPA considers the entrainment and impingement of airborne organisms in dry cooling not to constitute a factor upon which EPA rejected dry cooling as the sole technology basis for the final new facility rule.

Comment ID 316bNFR.056.012

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Kent Zammit

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Sustainable fisheries and healthy aquatic communities can co-exist with water intake structures - withdrawals, in fact, that greatly exceed the 2-MGD threshold proposed by EPA. An examination of municipal water withdrawals in rivers, lakes and reservoirs and the associated health of the aquatic community, including sport fisheries, in the water body they withdraw from would clearly indicate that large withdrawals, sustainable fisheries, and healthy aquatic communities can co-exist (NOTE: the aquatic community does not discern between the water withdrawal use -- cooling withdrawals, municipal withdrawals, irrigation withdrawals, hydropower withdrawals, and instream flow withdrawals all have the same potential for an impact in the water body from which the withdrawal occurs) (ADDITIONAL NOTE: Water withdrawals associated with municipal and irrigation supply have 100% entrainment mortality. Water withdrawn for these uses is NEVER returned to the source water body, and water withdrawn for recirculated cooling systems is also permanently removed from the source. Organism survival in once-through cooling water systems is often significant, frequently well above 50% of those organisms entrained).

EPA Response

The commenter failed to provide specific examples that support their assertion that withdrawals in exceedance of 2MGD can occur without impacting aquatic communities.

The two-track technology-based framework described in today's rule provides new facilities with the flexibility to minimize AEI through performance-based standards. Under today's rule facilities may choose to implement Track I performance-based standards or conduct site-specific biological monitoring under Track II to show comparable minimization of entrainment and impingement.

While EPA agrees that some species do appear to survive entrainment and impingement, it is also clear from multiple studies that many species exhibit high mortality rates in response to impingement and entrainment events. In the case of entrainment and impingement survival studies, survivorship is highly dependent on the species and life history stage affected. As discussed in section V.B.2.c of the preamble, a summary of entrainment mortality data from five Hudson River power plants indicated that mortality rates can be substantial. Today's rule seeks to minimize impingement and entrainment losses for all affected species. Finally, EPA has witnessed (during multiple facility visits) numerous entrained and impinged organisms being discarded at land-based sites. Thus entrained and impinged organisms are not always returned to their respective waterbodies.

Comment ID 316bNFR.056.013

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.01

Regulatory Framework Options

EPA's proposed approach to regulating CWIS, similar to it's approach for regulating discharges, is performance standard based. EPA's case for the need for performance standards is scientifically weak. Historical and current scientific information explicitly notes that environmental impacts from CWIS and the measures required to minimize impacts where they exist are site-specific. EPA should embrace this knowledge and develop a decision-making assessment framework for making impact and requisite BTA determinations. Such a framework exists in the Risk Assessment Approach developed by EPA for identifying impacts and the necessary remedial actions to mitigate or eliminate the impacts at hazardous waste sites. EPA has also expressed an interest or desire to extend this approach to remediation of watershed assessment issues. The science of risk assessment is appropriate for identifying populations exposed, assessing population reduction risks, and performing cost-benefit analysis toward determining BTA. EPRI strongly recommends that EPA develop a site-specific risk assessment approach for reaching scientifically, socially, and economically informed decisions regarding CWIS AEI, and BTA to minimize AEI.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that EPA believes serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

EPA believes that the two-track technology-based approach adopted today will allow the flexibility for facilities to assess site-specific risks and conditions for reaching scientifically, socially, and economically informed decisions regarding BTA to minimize AEI. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

Comment ID 316bNFR.056.014

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.0

Environmental Impact

Purpose and Summary

The last sentence in opening summary should include the word potential; i.e., it should read as follows: The proposed national requirements would minimize the potential adverse environmental impact associated with the use these structures. As written the sentence implies that all structures have an adverse environmental impact. As commented upon later, the technical case for the existence of AEI is rather weak and limited to some structures in specific water body types. Furthermore, because EPA does not explicitly define AEI, one cannot know whether or not it is occurring. EPRI recommends a general search of the terms AEI and insert of the word potential as is appropriate in the final EPA rule.

EPA Response

The statutory language of section 316(b) of the Clean Water Act requires minimization of adverse environmental impact. EPA has interpreted this phrase in the preamble to the final rule. As interpreted by EPA, EPA is to establish economically practicable requirements that minimize those impacts. EPA believes that the commenter intends to limit the definition of adverse environmental impact to demonstrated population or community effects. Because EPA does not view adverse environmental impact as this limited, it does not make sense to include potential adverse environmental impact.

Furthermore, the Agency is obligated to address the precise language of the statute. For additional discussion refer to section VI. B.2.a of the Preamble.

Comment ID 316bNFR.056.015

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

What Requirements Established?

Categories of 1) Freshwater Rivers and Streams, and 2) Lake or Reservoir

These two categories are too broad, in EPRI's opinion. The ecology of rivers and streams is significantly different and warrants separate consideration. Similarly, since reservoirs are an artificial and typically heavily managed ecosystem, they should be addressed separately from lakes. Furthermore, the Laurentian Great Lakes are significantly different in biological and physical processes than typical "small" lakes. Because of this difference, a separate category for the Great Lakes should be developed.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types.

Comment ID 316bNFR.056.016

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

The Clean Water Act

No comment except, as noted in the introduction, a wealth of information related to CWIS now exists in relation to what was available prior to 1980. EPA should thoroughly examine this information to develop a rule for new CWIS (and existing CWIS in the future) that is based on sound scientific principles and analysis.

EPA Response

Please see response to 316bNFR.056.004.

Comment ID 316bNFR.056.017

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

How 316 Implemented Now?

1977 draft guidance states environmental-intake interactions are highly site- specific and decisions as to BTA must be made on a case by case basis.

EPRI has provided EPA data in the form of presentations of various case studies that demonstrate the site-specific nature of environmental impacts and BTA determinations (e.g., the presentations at the 1998 Coolfont Workshop and the 1999 Conference in Atlanta -- peer-reviewed papers from those presentations are presented in Dixon et al. 2000). This flexibility in predicting the extent of impacts for each facility, and determining the most cost effective protection would allow the Director and Permitter to develop solutions that provide the best protection of aquatic populations, where needed.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.056.018

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Must Withdrawal be from Waters of US?

2 MGD threshold

There is no scientific basis for EPA's derivation of the 2-MGD threshold. A scientific derivation of the threshold would involve an analysis of absolute and/or relative withdrawal volumes in relation to documented impacts (i.e., population or community level effects). As we have noted in the introduction, available information indicates that EPA's proposed flow threshold is extremely conservative. The U.S. Nuclear Regulatory Commission (1996) and the Maryland Power Plant Research Program (1999) have both reported that the impacts of impingement and entrainment are relatively minor, except for a few plants where issues remain unresolved. The average flow rate for nuclear facilities nationwide is 1,440 MGD and the average flow rate for 13 facilities in the Chesapeake Bay mainstem is 615 MGD.

Relative to other EPA proposed thresholds (e.g., 1% of the mean annual flow, etc), none of them have a scientific basis. EPRI would be supportive of EPA should it desire to pursue the development of a scientifically based flow threshold. One research approach toward its development is briefly noted below.

Healthy aquatic communities with excellent sport fisheries can co-exist with much higher water withdrawal rates. Although a national survey and analysis has not been performed by EPRI, we are aware of both closed cooling ponds that support nuclear facilities and drinking water reservoirs that support municipal water withdrawals with healthy aquatic communities. For example, Coffey County Lake in Kansas is the cooling pond for the Wolf Creek Nuclear Station. The plant withdraws 763 MGD yet a strong large mouth bass sport fishery is present (Haines 2000 in Dixon et al. 2000). Similarly, the City of Richmond, Virginia withdraws 130 MGD from the lower James River for municipal distribution (NOTE: the aquatic community does not discern between cooling, municipal, or irrigation water withdrawals). A noted small mouth bass sport fishery is found in the location of this intake. The FDR Power Project on the St. Lawrence River withdraws nearly 160,000 MGD from Lake St. Lawrence. Yet the lake supports an outstanding sport fishery for muskellunge, northern pike, and smallmouth bass. EPRI recognizes that these are anecdotal observations; however, the point is that ideal natural experiments exist for a scientific derivation of a flow threshold -- these natural experiments include cooling ponds, reservoirs with only municipal water withdrawals, and hydropower reservoirs with only hydropower withdrawals.

EPA Response

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today’s rule.

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

The data noted is for existing facilities, which are not subject to this rule, many of which use once through cooling. Given trends towards greater efficiency and 316(b)'s mandate to use best technology to minimize adverse environmental impact, EPA believes that it is appropriate to address the majority of cooling water intake structure facilities.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.056.019

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 8.1

Identification of New Steam Electric Facilities

New Steam Electric Generation

94 planned facilities projected to fall under this regulation, 56 had submitted water use data, and 13 new facilities will incur costs due to this regulation in the next 10 years.

The basis for this overview of potential impact to the utility industry should be re-calculated. Since only 54 of the 96 proposed facilities submitted water data, it would have been more accurate to assume that the other 42 plants would have a similar profile of water use and included estimates of impacts to all of the plants likely to be impacted. This estimate also seems to be VERY low. California, alone, has a total of 33 plants with permit applications submitted (CEC 2000). The majority of these facilities are combined cycle. For the nine facilities listing water source, four are projected to use once-through cooling. As the industry continues to deregulate in other states, this pattern of re-powering old generation sites with new, efficient combined-cycle plants will likely continue. The Energy Information Administration estimates 84.5 Gigawatts of new capacity needed by 1005, 167.4 by 2010, 234.1 by 2015, and 299.8 by 2020 (EIA 2000). EPRI is also providing a printout of projected power requirements from their EPIC study (EPRI 2000). Assuming the same ratio of once-through to total number of plants as in California (4/33), approximately 95 Gigawatts of new capacity with once-through cooling could be expected to be built in the next 20 years. This regulation will have an impact for even those facilities that choose to adopt dry cooling, reclaimed water, or other technologies. The costs associated with adopting such approaches can logically be assessed to the avoided costs of complying with this regulation, among others. In general, it is probably not very accurate to assume that water use provisions for future power generation are going to follow past or current facilities

EPA Response

EPA believes that the commenter misunderstood the methodology used to estimate the number of impacted new combined-cycle facilities. EPA only used the NEWGen facilities to develop cooling water characteristics of new in-scope facilities. These characteristics were then applied to the forecasted capacity additions published in the Annual Energy Outlook to estimate the number of in-scope facilities. As such, EPA did assume that the 38 plants without cooling water characteristics have a similar profile to the 56 with available data. (Note that the commenter misreported EPA's findings from the proposed rule. EPA obtained cooling water characteristics for 56 out of 94 proposed facilities, not 54.) For a full discussion explaining EPA's methodology please see Chapter 5: Baseline Projections of New Facilities in the Economic Analysis document.

The commenter references power plant development in California. EPA disagrees with the findings presented by the commenter. EPA's final rule analysis includes 22 new greenfield and stand-alone combined-cycle facilities in California. EPA reviewed permit information from the California Energy Commission for 15 of these facilities; no information was available for the remaining seven facilities. Of the 15 facilities, six are proposing to use municipal water, four gray water, three groundwater, and

two dry cooling. None of these facilities will be subject to the final section 316(b) New Facility Rule. The commenter refers to a "pattern of re-powering old generation sites [...]" It appears that the California facilities identified by the commenter include existing facilities that propose to add capacity or re-power existing capacity. Even though existing facilities in California may be adding capacity using once-through cooling systems, the final New Facility Rule only considers new greenfield and stand-alone plants. Existing and re-powered plants will be addressed under the Phase II and Phase III of the 316(b) regulations.

Finally, the commenter claims that "[t]his regulation will have an impact for even those facilities that choose to adopt dry cooling, reclaimed water, or other technologies" and that "[t]he costs associated with adopting such approaches can logically be assessed to the avoided costs of complying with this regulation..." EPA disagrees with this statement. Where information was available indicating that a facility changed its baseline design because of the 316(b) New Facility Rule, the facility was costed at their original design, or a technology of a similar or higher cost. Otherwise, it was assumed that the choice of cooling system was based on existing regulations, or site- or state-specific considerations.

Comment ID 316bNFR.056.020

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Kent Zammit

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Environmental Impacts of CWIS

Environmental Impacts

The title of this section focuses on environmental impacts; however, in the text EPA immediately focuses on adverse environmental impacts. A distinction between environmental impacts and adverse environmental impacts (AEI), therefore, must exist. EPA fails to provide this distinction or, more specifically, define AEI. How can one know if it exists if it is undefined? Furthermore, how can an undefined term be minimized? Issues associated with the definition of AEI are further discussed below.

EPA Response

Please see response to comment 316bNFR.009.001.

Comment ID 316bNFR.056.021

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

Author Name Kent Zammit

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Overview

All of the seven new facilities in EPA's analysis are projected to use less than 20 MGD.

Using the calculations provided in comments for section V.D above {316bNFR.059.018}, and assuming that 33% of the total plant power is provided by the Rankine cycle, any combined cycle plant generating more than 200 MW would likely use more than 20MGD with evaporative cooling. Of the plants proposed for CA alone, 5 exceed this capacity.

EPA Response

The commenter is addressing combined-cycle plants in this comment. As discussed in the notice of data availability (NODA), EPA has used new data, which have become available since the proposal, to update the analysis on combined-cycle plants. As a result, the number of new combined-cycle facilities now projected to be in scope of this rule has increased from 7 base facilities (extrapolated to 24) in the proposed rule analysis to 57 base facilities (extrapolated to 69) in the updated analysis for the final rule. All 69 plants are projected to be over 200 MW (range is from 439 MW to 1061 MW). The actual intake flow depends on whether the facility has a once-through system or closed-cycle recirculating wet cooling system. If all these plants had once-through cooling systems, then all 69 plants would have intake flows greater than 20 MGD. However, based on information collected, EPA projects that only 5 are planning to have a once-though cooling system. The remaining 64 plants planning to install wet cooling towers have intake flows less than 20 MGD.

Comment ID 316bNFR.056.022

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.1

Overview of Current Situation of AEI

It is also noteworthy, however, that between 1955 and 1977 the number of new steam electric generating facilities using closed-cycle recirculating cooling water systems increased from 25 to 75 percent, with a corresponding decrease in facilities using once- through systems.

Why this is noteworthy is unknown. EPA should explain why it believes this change is noteworthy. The most likely reason for this change is the overly burdensome and time-consuming existing process for siting and permitting a once-through cooling operation. Rather than navigate the process, designers of new facilities include closed-cycle operation in initial capital cost planning. These costs (whether or not they are necessary) are passed to the consumer in higher rate payments.

EPA Response

EPA believes this is noteworthy because this trend has occurred in the absence of any regulations mandating such action and because this helps to demonstrate the technical availability and economic practicality of this technology. Currently there are no regulations under section 316(b) governing once-through cooling water systems. The purpose of this rulemaking is to establish such regulations.

Comment ID 316bNFR.056.023

Subject Matter Code	9.2
Types of Environmental Impacts Caused by CWIS	

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Organization Electric Power Research Institute (EPRI)

What types of EI Caused by CWIS?

The mortality rate of entrained organisms is high.

This statement is made without a supporting scientific analysis. EPRI, however, has recently completed this comprehensive analysis (EPRI 2000) and it concluded that mortality is highly variable depending on species, specific life stage affected, organism size, plant operating characteristics, and discharge temperature. Mean survival values for most species exceed 50% and for some species, survival exceeds 75%.

EPA Response

EPA recognizes, as pointed out by the commenter, that entrainment mortality is highly variable and depends upon a number of factors. Nevertheless, EPA has provided documentation which demonstrates that the mortality rate for some organisms can be as high as 100 percent. See sections III and VI.B.2.c of the Preamble for a more thorough discussion of this issue.

Comment ID 316bNFR.056.024

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.2

Types of Environmental Impacts Caused by CWIS

Sources of such stress include physical impacts in the pumps and condenser tubing, pressure changes caused by diversion of the cooling water into the plant or by the hydraulic effects of the condenser, sheer stresses, thermal shock in the condenser and discharge tunnel, and chemical toxemia induced by antifouling agents such as chlorine.

Results from the recently completed EPRI study on entrainment mortality indicate that discharge temperature is the controlling factor for entrainment mortality (EPRI 2000). All of the aforementioned impacts could be minimized in a cooling water system designed for high volume, low velocity flow, which would minimize differential temperature. Such a system would be specifically eliminated by this regulation.

EPA Response

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may also reduce stress on higher levels of ecological organization. Further, EPA believes that the 0.5 ft/s velocity requirement is scientifically based, technically sound, protective of aquatic resources and technically and economically available as demonstrated by its use at many facilities.

EPA does not agree with commenters premise that high volume flows would necessarily minimize entrainment mortality. Temperature differential is one of the factors affecting entrainment mortality; others include pressure changes, mechanical stress, and the use of biocides in the cooling system. Further, high volume intakes would result in far more organisms being drawn into the facility. Also there is no evidence supporting the proposition that lower temperature differentials would convert what is a documented situation of substantial aquatic organism mortality into a benign outcome. This is especially so if greater numbers of organisms are exposed to the journey through the cooling system because the volume of cooling water used is substantially higher. Thus, EPA does not agree with the commenter that elimination of these types of systems is a significant issue.

See sections VI.D and VI.E.1-2 of the Preamble for further discussion of these issues.

Comment ID 316bNFR.056.025

Subject Matter Code	9.2
Types of Environmental Impacts Caused by CWIS	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPA is concerned about adverse environmental impact associated with the construction of new cooling water intake structures.

Federal, state and local provisions currently address minimizing construction impacts for any type of facility. EPA's concern infers that these rules are ineffective.

EPA Response

As discussed in section VI.B.1 of the Preamble, EPA believes there is a need for design and construction technologies to minimize adverse environmental impact and that this rule will achieve that objective. Please see Response to Comment 316b.NFR.056.005 for additional discussion regarding the need for today's rule making.

Comment ID 316bNFR.056.026

Subject Matter Code	9.2
Types of Environmental Impacts Caused by CWIS	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Organisms are trapped against these screening devices by the force of the water passing through the cooling water intake structure.

Many of the larger impingement episodes that CWIS experience are due to dead or moribund fish, caused by environmental phenomena such as low dissolved oxygen (lake turnover) and rapid temperature declines (cold shock). These dead and moribund fish are subsequently "collected" on intake screens.

EPA Response

While the Agency concedes that there are episodes in which dead and moribund fish are collected on intake screens, there is a well documented record of impingement episodes unrelated to this factor. Further, EPA does not agree that collection of dead and moribund fish is a documented significant or sole cause of fish impingement mortality. See sections III and VI.B of the Preamble for further discussion of this issue.

Comment ID 316bNFR.056.027

Subject Matter Code	9.2
Types of Environmental Impacts Caused by CWIS	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPA is concerned about adverse environmental impact associated with construction of new cooling water intake structures.

It is likely that the majority of new generation constructed with once through cooling will be using the existing CWIS of existing generating capacity. It is doubtful that a facility would be constructed in the future using once- through cooling in an area where significant habitat could be disrupted.

EPA Response

As discussed in section VI.B.1 of the Preamble, EPA believes that additional technologies to minimize adverse environmental impact are technically available and economically achievable. Further, these technologies are important to protect all species, not just species deemed to be in a significant habitat.

Comment ID 316bNFR.056.028

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

What E/I Impacts Have Been Documented?

General overview

The general development of this overview is technically weak focusing on a few high profile power plants, all with extremely high intake flow rates (average flow of 2,100 MGD). Furthermore, the information presented by EPA for some of the plants are extremely outdated. More up-to-date information is readily available. For example, EPA does not note that striped bass populations in the Hudson River have increased 10-fold since the 1970s despite the operation of the multiple plants. For the Brunswick Station, EPA does not discuss the actions taken at the plant to reduce the potential impacts noted during 1979. More importantly, EPA does not compare the 1979 predictions to the current status of fish populations in the Cape Fear Estuary.

EPA Response

EPA believes that it has used the best information available for the proposed and final rule. There are few, if any, recent data documenting impingement or entrainment rates at the majority of existing facilities and many of the available reports are for larger facilities (for which environmental impact concerns were greatest) and contain analyses conducted 20 to 25 years ago. To the extent possible, EPA has supplemented the facility information in the record for this final rule to include smaller facilities and updated information.

EPA would note that the data presented on the Hudson River can be interpreted to mean that fish populations are improving due to the efforts of other programs such as those which have reduced nutrient and toxics loadings, despite the documented mortality related to the operation of cooling water intakes.
EPA acknowledges that historical data from selected facilities may not reflect current impingement and entrainment rates at certain facilities, particularly if technologies and other operational measures for reducing impingement and entrainment rates at the facility have been implemented since the original study.

Also, please see response to comments 316bNFR.056.005 and 316bNFR.056.007.

Comment ID 316bNFR.056.029

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

...documented cases of impacts associated with impingement and entrainment and the subsequent effects of these actions on populations of aquatic organisms (underlined words for emphasis by EPRI).

EPA's use of the terms impacts and effects is confusing and appears to depart from the contemporary, or scientifically accepted meaning of impacts. In fact, EPA's use of the terms reverts to debates held, and since resolved, in the 1970s and early 80s. A clear definition of term impacts is extremely important toward defining and understanding AEI. Voigtlander (1981) presents an excellent paper in which he discussed discussions on the meaning of the term impact. Voigtlander notes "Despite the lack of precision in the use of the term, several concepts have emerged which are implicitly or explicitly applied to our understanding of what an impact is. The first of these concepts is that of man-induced change, language which comes almost directly from NEPA and other environmental legislation. The second is that of significant long-lasting change. In fact the concepts of significance and impact have emerged- obviously, no one is interested in non-significance." Voigtlander goes on to note that the scientific literature up to the time of his paper supports that "Impacts are expressed at the population level." EPRI submits that nothing has changed since publication of the Voigtlander paper. Assessing impacts is only workable and meaningful when they are assessed at the population and/or community level. More specifically, an impact exists when there is a change in the population of a species or in community structure and function.

EPA Response

EPA believes that adverse environmental impact includes many types of impacts: impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries, and stress to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function.

EPA disagrees with the commenter's implication that only population impacts are meaningful. Population impacts are one of many ways to assess adverse environmental impact from cooling water intakes.

See, also the response to comment 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble for additional discussion of issues raised in this comment.

Comment ID 316bNFR.056.030

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

What Constitutes AEI?

Almost all the approaches proposed by EPA for defining AEI lack a scientific foundation. Environmental Impact (EI) should be defined as a population or community level consequence. Adversity should be determined within the desired management context for a species or community. The Utility Water Act Group (UWAG), as EPA notes, has developed a definition that focuses on (1) the protection of threatened, endangered, or otherwise listed species, (2) protection of socially, recreationally, and commercially important species and (3) protection of community integrity, including structure and function. UWAG has asked EPRI to mange the technical peer-review process for their proposed definition. Results of this analysis will be available in early 2001.

EPA Response

Please see response to comment 316bNFR.009.001 and the preamble to the final rule.

Comment ID 316bNFR.056.031

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

...define AEI in relation to reference sites for the type of ecosystem...adoption of biocriteria into State water quality standards

EPRI (2000) concluded that significant progress has been made in the development and interpretation of biocriteria for streams and reservoirs. The biocriteria approach (and inclusive reference sites) is, however, a tool for assessing community structure and function and not for identifying the cause of impairment. One of the most difficult aspects of this approach, is the selection of reference sites. This issue is discussed in detail in EPRI's (2000) report; essentially reference sites must reflect water use management objectives including the introduction of exotic species rather than some arbitrary definition of 'minimally impaired' reference location. EPRI also concluded that (1) considerable research remains before the effective development, implementation and interpretation of biocriteria for rivers can be attained, and (2) fish-based biocriteria for estuaries, oceans and the Great Lakes may be problematic because, at best, the scientific community is many years from developing effective indices, or worst, the high population variability and dynamic nature of these systems will forever preclude their development.

EPA Response

EPA agrees that identification of reference sites can be problematic for many of the nation's waterbodies and further notes that biocriteria guidance for several waterbody types is currently unavailable. For these reasons and others discussed in section VI.B.2.d of today's preamble, EPA has rejected this approach to assessing AEI for the purposes of today's rule.

Comment ID 316bNFR.056.032

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Defining AEI more broadly to include nonaquatic impacts.

Certainly, the emphasis that this rule places on recirculated cooling systems will have non-aquatic impacts. The environmental impacts of cooling towers are well documented in literature, and include salt drift and deposition, increased heat rate (with resulting CO2 emissions, air pollution, etc.) But some of the less obvious impacts of cooling towers include 1) water withdrawn from the source is not returned, possibly causing additional aquatic impacts, 2) Recirculated systems will require higher chemical treatment rates, including biocides and anti-scalants, with associated discharge issues, 3) Cooling tower blowdown must be stored in evaporation ponds or treated prior to discharge, resulting in potential for groundwater impacts and disturbance of terrestrial habitats. If EPA would like additional information on such impacts, EPRI would be happy to provide sources.

EPA Response

See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Comment ID 316bNFR.056.033

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

What are Proposed and Alt. Frameworks?

BTA might constitute a technology suite

EPRI has generated a catalog of available fish protection technologies which clearly defines the various types of technologies available and their applicability to water body type and CWIS locations. We agree that technology selection is very dependant on site specific conditions, and are currently developing a second report to provide guidelines on developing a suitable subset of applicable technologies for detailed evaluation. This report will be available by the end of 2000, and EPRI will provide copies of the report when it is available.

EPA Response

In the final rule, EPA is establishing the two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.056.034

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Because different water body types have different potential for adverse environmental impact, the requirements proposed to minimize adverse environmental impact would vary by water body type

This statement implies that AEI has been defined, yet no definition is offered. How does one know of the differing potential for AEI if it is not defined?

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) for all waterbody types.

For the criteria addressed in the statute (location, design, construction and capacity), EPA has identified factors that contribute to AEI, examined technologies that address these key factors, and established requirements based on which of these requirements or combinations of these requirements are available, effective, and economically practicable. The final rule requirements are predominantly technology-based, however, they have been developed to address the impacts posed by cooling water intake structures. EPA has described potential adverse environmental impacts associated with cooling water intake structures in the proposed rule (Section VII) and again in the final rule (Section III).

Comment ID 316bNFR.056.035

Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Estuaries have the highest potential for adverse environmental impact

Except for anecdotal observations regarding estuarine - productivity, EPA provides no scientific evidence that estuaries are more sensitive to the potential impacts of CWIS than any other water body type. We also have seen no scientific data to indicate that all estuarine and tidal river areas are particularly sensitive. In fact, as EPA notes for freshwater systems, extremely low productive areas also exist in an estuarine "profundal" zone. One of the possible reasons for EPA to conclude that estuaries are more sensitive to CWIS impacts is the relatively high mean entrainment rates noted for estuarine facilities compared to facilities that use freshwater systems. (Note: mean impingement rates for all water bodies are roughly within an order of magnitude per EPA's summary data in the engineering support document). Mean entrainment rates for eggs, larvae, and juveniles for plants in estuaries and oceans are several order of magnitude higher than the mean rates for freshwater systems. This is not surprising because the life history strategies for marine pelagic fish are very different than the reproductive strategies of freshwater fish. They invest considerably more in reproduction to insure survival in the face of a fluctuating physical and biological environment (or patchy resources on a large spatial scale). It is, therefore, expected that CWIS located in estuarine and coastal areas would entrain considerably more organisms per facility relative to those located in freshwater systems. This higher entrainment rate, however, does not imply a greater potential for population-level impact. Three key technical papers, describing research sponsored by EPRI that are related to this issue are submitted for EPA review (Winemiller and Rose 1992 and 1993; Chambers and Leggett 1996)

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

While EPA acknowledges that multiple factors may affect impingement and entrainment at a given intake, EPA concluded that intake velocity is a very significant factor because there is ample evidence contained in the record to support a correlation between velocity and/or flow and impingement and entrainment. The final rule recognizes that intake velocity is one of the key factors affecting the impingement of fish and other aquatic biota. The velocity of water entering a cooling water intake structure exerts a direct physical force against which fish and other organisms must act to avoid impingement and entrainment. The compilation of swim speed data (DCN #2-029 in the record of the rule) demonstrates that many fish species are potentially unable to escape the intake flow and avoid being impinged. The record also supports the proposition that flow is related to entrainment. See 316bNFR.068.006 for further discussion on this topic.

Comment ID 316bNFR.056.036

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.021

Request for Comment: Intake Velocity Limitation

Intake velocity is one of the key factors that affects impingement of fish and other aquatic biota

EPRI has recently completed a detailed assessment of the importance of approach velocity in determining potential impingement impacts. This report (EPRI 2000c) will be submitted to EPA on or before December 15, 2000. The study concluded that intake velocity is an important, but not sole, consideration in regulating CWIS.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

While EPA acknowledges that multiple factors may affect impingement and entrainment at a given intake, EPA concluded that intake velocity is a very significant factor because there is ample evidence contained in the record to support a correlation between velocity and/or flow and impingement and entrainment. The final rule recognizes that intake velocity is one of the key factors affecting the impingement of fish and other aquatic biota. The velocity of water entering a cooling water intake structure exerts a direct physical force against which fish and other organisms must act to avoid impingement and entrainment. The compilation of swim speed data (DCN #2-029 in the record of the rule) demonstrates that many fish species are potentially unable to escape the intake flow and avoid being impinged.

Comment ID 316bNFR.056.037

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

"Littoral Zone"

As noted in the introduction, EPRI strongly recommends that the concept be abandoned. The littoral zone is an amorphous concept in the scientific literature and its boundaries cannot be defined with variable parameters, such as light intensity.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.056.038

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

As in the comment on estuaries above, higher productivity does not necessarily equate to higher vulnerability to CWIS operation.

EPA Response

See response to comment 316bNFR.056.010.

Comment ID 316bNFR.056.039

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.021

Request for Comment: Intake Velocity Limitation

0.5 fps criteria (average through screen velocity)

As noted above, EPRI recently completed a detailed evaluation of the 0.5 fps criteria. The final report will be provided to EPA on or before December 15, 2000. This research has concluded the following:

For the majority of fish for which data are available, impingement depends on conditions of organisms and environmental health as much as on water velocity alone. How sufficient a velocity guideline can be for limiting impingement will depend upon the site specific characteristics of the water body and its fish populations. It is therefore recommended that intake velocity be an important, but not sole, consideration in regulating CWIS.

EPA Response

See response to comment 316bNFR.056.036.

Comment ID 316bNFR.056.040

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.021

Request for Comment: Intake Velocity Limitation

When EPA's through-screen criteria of 0.5-fps are presented in equivalent measures to criteria developed by the National Marine Fisheries Service (NMFS), EPA's criteria is more stringent. When presented on a similar flow vector basis, NMFS criteria is 0.75-fps.

EPA Response

See response to comment 316bNFR.001.001.

Comment ID 316bNFR.056.041

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.021

Request for Comment: Intake Velocity Limitation

If an approach velocity criteria is pursued in the final rule, it should be measured parallel to the main water movement in the intake forebay and in the zone between 3 inches and 1-foot from the screen face, to consist of the velocity prior to divergence of flows past structural members of the screen.

EPA Response

In the final rule, EPA has not adopted approach velocity as the measure for intake velocity. EPA recognizes that approach velocity has been a measurement technique for intake velocity in the past. However, many recently constructed facilities have been designed to meet through-screen intake velocity limitations. Additionally, EPA notes that design through-screen velocity will be simpler to measure and therefore be easier to implement on a national level for both regulators and facilities than approach velocity. New facilities may be designed with consideration given to the through-screen velocity requirement, and designs may be altered accordingly. Intake velocity will also be simpler to measure, as facility engineers can simply calculate the intake velocity on the basis of intake flow and the intake screen area, as opposed to the more complex data gathering process involved in measuring approach velocities near an intake screen.

EPA also recognizes that, given a 0.5ft/s design intake velocity, the approach velocity will be less than 0.5 ft/s. By definition, the through screen velocity will be higher due to the reduced cross-sectional area of the intake flow. Water entering the intake is constricted to the open areas between the screen mesh or other physical screen elements, thereby increasing the velocity of the water as it passes through the screen. The intake velocity requirement is intended to be a highly protective requirement. EPA established the 0.5 ft/s design velocity standard, as measured by through-screen velocity, to ensure that, regardless of the intake structure design or the presence of sufficient detection or avoidance cues, the intake velocity is low enough to protect of a majority of fish species. For these reasons, the final rule maintains the requirement to measure intake velocity on a design through-screen basis.

Comment ID 316bNFR.056.042

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

These stakeholders believe a site-specific approach...identify technology options for minimizing AEI at a particular site at significantly less cost…

Many of the papers presented at the Coolfont Workshop and Atlanta Conference (Dixon et al. 2000) indicate the site-specific nature of technology application. Many of these technologies are species specific, and thus would not be applicable across "broad environmental categories." EPRI believes that the most economic determination of BTA is through a site-specific analysis of the potential benefits and costs of candidate technologies, as determined through a defined process. Such a process is currently being documented in an EPRI report that will be available by December 15, 2000.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.056.043

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

...dry cooling towers do not require the use and subsequent treatment of water conditioning chemicals or biocides…

It is true that the elimination of the air/water interface associated with wet cooling towers minimizes the need for biofouling control, any closed water circulation system is subject to fouling (including biofouling), scaling and corrosion. Therefore, water-conditioning chemicals would likely be used in most dry cooling installations. Discharge from these systems would be low, so impacts from this treatment would be minimal.

EPA Response

EPA agrees with the overall thesis of the statement made by the commenter: that chemical treatment discharges from dry cooling towers are minimal.

Comment ID 316bNFR.056.044

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Dry cooling systems perform most efficiently in colder climates, where temperature differential is greater...and is generally less efficient in warmer climates…

ANY type of cooling system will perform better in colder climates, because the same temperature differential would be afforded to all installed systems. The efficiency penalty associated with dry cooling comes from the fact that dry cooling can only approach Dry-Bulb Temperature (DBT). Wet cooling systems can approach the Wet-Bulb temperature (WBT). This difference is greatest in arid regions, where significantly cooler water temperatures can be achieved by evaporative cooling (approaching the WBT), while the DBT remains high. In colder climates, where the differences between DBT and WBT are less, dry towers will perform more closely to wet towers than in hot, arid climates. Dry towers are also limited in that they do not allow for intimate mixing of the "cold stream" and the "hot stream." Therefore, all heat transfer in a dry tower must be done conductively through the tube walls and then convectively from there to the atmosphere. This process is also less efficient than the convective heat transfer process of a spray tower. (Wark 1977)

EPA Response

EPA agrees with the commenter.

Comment ID 316bNFR.056.045

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

New York State officials estimate a 1.4 to 1.9 percent reduction in overall plant electrical generating capacity ...

Calculation of energy penalties for the various cooling options would require a thermal analysis of the plant, as designed, using the meteorological conditions as mentioned above. Variances in efficiency penalty can be significant depending upon design and site conditions, so this is another case where one number, or even a range of numbers, does not fit all.

EPA Response

EPA agrees with the commenter and has conducted the analyses suggested for the final rule. EPA's results agree with the general statements made by the commenter. See Chapter 3 of the Technical Development Document for discussion of energy penalties at dry and wet cooling towers.

Comment ID 316bNFR.056.046

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA is inviting comment on factors which may favor or disfavor the use of dry cooling…

It is fairly obvious that the factors that disfavor the use of dry cooling are dominated by 1) increased capitol cost. 2) decreased operating efficiencies, and the associated impacts of air pollution, climate change, etc., and 3) increased O&M costs. EPRI is currently preparing a report on these impacts associated with power facilities in California for the California Energy Commission. This report will be available by the end of the year, and will be provided to EPA as soon as possible.

EPA Response

EPA agrees with the statements made by the commenter regarding the factors that affect dry cooling performance, although other factors are relevant, as discussed in Section V.C of the preamble to the final rule.

EPA notes that it received the draft report mentioned in the comment on September 24, 2001, far after the close of the proposal and notice of data availability comment periods and well into the final production phases of the final rule. Regardless, EPA reviewed the report in the manner that the extremely short time period afforded and found that it presented no new perspectives on the subject of dry cooling.

EPA has no legal obligation to respond to such late comments. See e.g., Personal Watercraft v. Dept. of Commerce, 48 F.3d 540 (D.C. Cir. 1995). Nevertheless, EPA has attempted to respond to these comments to the extent possible.

Comment ID 316bNFR.056.047

Subject Matter Code	10.12
Request for Comment: Best Technology Available Requirement "Trading"	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

The Agency invites comments on all aspects of an approach that would allow trading among components of BTA

EPRI believes that the flexibility of this approach may allow for new and innovative CWIS technologies that would be otherwise eliminated by prescriptive requirements. For example, if AEI at a particular site was caused primarily by entrainment losses, and impingement was negligible, there may be reason to test new technologies that would safely divert entrained organisms (example: using high intake velocities through a centrifugal separator to minimize entrainment losses).

EPA Response

See response to 316bNFR.008.009.

Comment ID 316bNFR.056.048

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.13

Request for Comment: Uniform Set of Standards Applicable to All Facilities

EPA also is considering...apply BTA requirements proposed for estuaries and tidal rivers to all facilities ensure that the same stringent controls are the nationally applicable minimum...

EPRI does not believe this option would most cost-effectively address the fish protection issue, since money would be spent for systems that would have minimal impact at many sites.

EPA Response

See response to 316bNFR.027.008. EPA is not required to demonstrate receiving water quality benefits in setting technology-based requirements.

Comment ID 316bNFR.056.049

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Site Specific AEI and BTA determinations

EPRI has made the point throughout all of our comments that these two determinations are very site specific and the flexibility to make these determinations based on site specific conditions would provide the most economic rule compliance for new and existing facilities.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.056.050

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 12.0

Best Technology Available-Flow and Volume

Flow and Volume

Restricting CWIS withdrawals to a percent of ambient flow

While the reasoning behind this restriction may be logical, there are also very sound arguments where this same method would be detrimental. For instance, it may be better to withdraw water from a small tributary that has low biological activity (acid mine drainage, for example) than a source with a larger flow and higher activity. Again, a rule that offered flexibility would provide for these kinds of trade-offs.

EPA Response

EPA is not relaxing the intake flow standards for facilities located on impaired waterbodies because such a designation is intended to be temporary. The goal of EPA, as well as other federal and state agencies, is to improve the overall quality of impaired surface waters and provide protection for aquatic environments. Allowing unlimited water withdrawals on impaired waters could seriously hamper future efforts to improve water quality.

Without further information regarding the commenter's hypothetical situation (waterbody type, instream flow, etc.) EPA cannot address the appropriateness of example. EPA notes that it has included a limited provision for alternative requirements in today's final rule.

Comment ID 316bNFR.056.051

Subject Matter Code	12.1
	Freshwater Streams/Rivers

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

The Agency reviewed data on water use by existing facilities in arid reasons of the country...80%...do not use waters of the US.

The Agency gives no indication as to why they feel this trend would continue. As competition for water in the US (not just arid regions) continues to increase, it is likely that use patterns will shift dramatically, so past usage is not necessarily a good prediction.

EPA Response

EPA's review of cooling water use data by existing facilities located in the southwestern United States indicated that 80% did not use waters of the US and therefore, would not be subject to this rule. The limited nature of water sources--and the associated economic cost--encourages facilities with cooling needs to seek alternative solutions, including gray water, sewage effluent and recirculating systems.

EPA agrees that competition for water resources will increase in the near future and subsequently place additional pressure on the use of water in the cooling process. Economic and resource availability concerns may shift use patterns in the future, but EPA believes that any shift will likely be away from using large volumes of cooling water and instead towards recirculating or dry cooling systems, or towards alternative sources of cooling water.

The NewGEN database indicates the shift away from surface waters, particularly in the southwestern United States, is likely to accelerate in the coming years. Thirty-four facilities steam electric generating facilities are currently planned for construction in five southwestern states (AZ, NM, UT, NV, CA). Of the 34, it is estimated that 33 will not be subject to today's final rule due to use of an alternative cooling system type (dry cooling) or an alternative cooling water source (gray water, ground water, municipal).

Comment ID 316bNFR.056.052

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 14.3

Request for Comment: Consideration of Minimum Technology Requirements

Additional Design and Constr. Technologies

EPA also solicits comment on whether certain minimum technologies might be appropriate in virtually all circumstances...For example...fine mesh screens...with proposed velocity requirement would effectively reduce impingement. …

The velocity limits may reduce impingement at some installations, but the addition of fine mesh screens would not change impingement rates at all. The purpose of the fine mesh screens is to minimize damage to specific species and life stages so they can be removed to bypass and handling systems with minimal physical damage. Again, appropriate technology application requires a very site-specific evaluation.

EPA Response

EPA agrees that fine mesh screens are primarily effective to reduce entrainment. Track II provides flexibility for permittees to select and implement the design and construction technologies that are most effective in minimizing impingement mortality and entrainment of all life stages of fish and shellfish.

Comment ID 316bNFR.056.053

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Role of Restoration Measures?

...restoration measures would not be allowed...critics argue...they are not effective in compensating for the specific I/E losses caused…

There are many examples of environmental enhancements that have provided tremendous benefit to offset facility losses. The more critical question involves how such performance can be measured. EPRI will undertake a project in 2001 to catalog known enhancements, productivity, and measurement methods, with appropriate guidelines. The Agency should also recognize that most enhancements have benefits that extend way beyond the species experiencing impacts. In addition, most of these enhancements will continue well beyond the operation of the facility.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.056.054

Subject Matter Code	16.5
Request for Comment: Use of Innovative Technologies	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Other Approaches Being Considered

EPA is considering a variance alternative based on the use of innovative CWIS design and operation.

This option would definitely be beneficial, especially under the conservative nature of the proposed rule. Under this option, new facilities would be able to propose new and innovative technologies that may not even be conceptualized at the time the rule is adopted. Elimination of such a provision would stifle the creativity of the scientists, power producers and vendors alike to develop new, more effective and cost-effective alternatives to current technologies.

EPA Response

See response to comment 319bNFR.071.019

Comment ID 316bNFR.056.055

Subject Matter Code	17.3
	Diversion

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Diversion and Avoidance Systems

Behavioral barriers not always used to protect fish and organisms

Behavioral barriers have predominantly been utilized at hydroelectric facilities, where extensive testing has led to very limited success. Known installations and performance results have been cataloged by EPRI in a study published in 1998 (EPRI 1998).

EPA Response

EPA understands that there are limitations to some technologies and that they may not be appropriately applied to all facilities to meet the requirements of the new facility rule This rule was specifically written to allow site-specific determinations by the facility itself as to which technologies would be most appropriate based on their knowledge of conditions at the facility and in the waterbody.

Comment ID 316bNFR.056.056

Subject Matter Code	17.3
	Diversion

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Behavioral barriers and diversion devices protect motile organisms

The Gunderboom is an example of a diversion technology (barrier nets defined as a diversion technology) that also provides protection for non-motile organisms

EPA Response

EPA appreciates the submittal of this information by the commenter.

Comment ID 316bNFR.056.057

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 8.1

Identification of New Steam Electric Facilities

How is Cost Considered in BTA?

"approximately 88% of the new facilities that do have steam-electric prime mover and for which EPA was able to obtain cooling water information would not be subject to this regulation...

See comment in Section VI.B concerning number of plants affected. {see 316bNFR.056.019}

EPA Response

See response to comment 316bNFR.056.019.

Comment ID 316bNFR.056.058

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

What Information Submitted in Application?

Source Water Baseline Characterization (1 year study)

A one-year study would provide information of limited utility, particularly in estuarine and coastal areas where fish populations exhibit tremendous inter-annual variability in presence and in numbers.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.056.059

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

$35,000 estimated cost for the characterization study

This is a gross underestimate of the requisite cost for a 1-year study. Experimental design, field sampling, sorting of specimens, identification of eggs, larvae, juveniles and adults, data processing and analysis, and reporting are all labor-intensive. At a minimum, $100,000 would be required for a somewhat credible characterization of site biological conditions over a one year period. However, as initially noted, the l-year study is unlikely to characterize long-term biological characteristics of the area.

EPA Response

See Response to Comment 316bNFR.501.027.

Comment ID 316bNFR.056.060

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Baseline Biological Characterization Study

In addition, you would be required to reevaluate the study and perform additional ambient monitoring before submitting an application for reissuance of the permit to establish or reestablish the baseline for the next permit term.

When a facility has been operating for an extended period of time without any indication of discernable impact to ambient populations, such monitoring requirements would be needlessly burdensome and expensive.

EPA Response

The final rule requires the applicant to select and install design and construction technologies that minimize impingement and entrainment of fish, eggs, and larvae and to maximize survival of impinged adult and juvenile fish. See § 125.84(4). For the final rule in Track I, EPA does not require baseline biological characterization monitoring. Rather, it requires the applicant to gather and present historical information and/or literature to support or justify the design and construction technologies the applicant chose to implement at the new facility. See 40 CFR 125.84(4). For each subsequent NPDES permit, the Director must determine whether additional requirements for design and construction technologies should be included in the permit. See 40 CFR 125.89(a)(2) and (b)(1).

Comment ID 316bNFR.056.061

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

12 month pre-operational baseline vs. post operational data

The directive that 12 months of pre-operational baseline biological assessment data could be compared to similar post operational data to determine the effectiveness of location, flow and velocity of the intake suggests that EPA still does not understand the natural variance of aquatic populations. This also implies that the Director can make these types of simplified evaluations, and assess the performance of the CWIS, when the CWIS may not be the only impact to the water body. In addition, the baseline year may not be representative of "average" population characteristics.

EPA Response

See Response to Comment 316bNFR.056.060.

Comment ID 316bNFR.056.062

Subject Matter Code 19.2

Baseline Biological Characterization Study

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPA has estimated a cost of approximately $32,000 per facility for an activities...associated with the Source Water Baseline Biological Characterization.

EPRI has been involved and reviewed many such studies and feels this estimate is incorrect. While some of the past studies have been longer (multi-year), they have not been necessarily less comprehensive than what EPA has proposed for this rule.

EPA Response

See Response to Comment 316bNFR.501.027.

Comment ID 316bNFR.056.063

Subject Matter Code	19.4
CWIS Flow and Velocity Data	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

CWIS Velocity and Flow Data

Would require you to submit information on the intake structure and to provide a water balance diagram for your facility. The Director would use this information to evaluate the potential for I/E of aquatic organisms.

In Section VII.C, EPA states that "A limitation of using the wholly disproportionate test for new facilities ...is that the I/E estimated before a facility is built can be very imprecise." EPA has not made it clear why they feel this data is too imprecise to use in cost-benefit analysis, but it is suitable to use in AEI and BTA determinations.

EPA Response

For this new facility rule, EPA is not considering the use of the wholly disproportionate cost test for determining appropriate BTA for each facility. Instead EPA is examining, on a national basis, cost to revenue ratios and potential barriers to entry in a manner analogous to how it looks at economic achievability for certain effluent limitations guidelines and all new source performance standards. EPA has evaluated potential benefits of the rule based on data derived from existing facilities and allows the use of estimates of impingement and entrainment in determining the technologies that will be implemented to minimize adverse impact.

Comment ID 316bNFR.056.064

Subject Matter Code	20.2
Monitoring Requirements	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

What Would I Be Required to Monitor?

Impingement and entrainment monitoring

What is the purpose of collecting this data other than to show numbers of fish entrained and impinged? There are alternative methods to obtain the information required, assuming population and community-level impacts are the issue of concern. In many cases this can be accomplished with in-field monitoring or via tracking of species and community indices that are routinely generated by resource agencies as part of recreational and commercial fisheries management.

EPA Response

The purpose of collecting this data is to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. These data would also be used by the permitting authority in subsequent permit terms to determine whether additional or modified design and construction technologies are reasonably necessary.

Comment ID 316bNFR.056.065

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 20.3

Head Loss Monitoring

EPA would require monitoring of head loss across the intake screens…

Most intake screening systems would necessarily have low head losses, typically less than a few inches of water column. Measurement of this head loss would be difficult and subject to inaccuracy because the amplitude of the measurement value (actual head loss) will be small as compared to the noise (waves, boat wakes, tides, etc.).

EPA Response

EPA realizes that there may be site-specific conditions that may render monitoring of head loss difficult. The regulations do not prescribe the conditions under which monitoring is to be conducted or otherwise limit the discretion of the permitting authority to establish flexible requirements to address transient conditions such as those described by the commenter. These conditions should be brought to the attention of the permitting authority for resolution. EPA is confident that permit writers will establish head loss monitoring requirements that take into account short-term variations associated with non-recurring conditions.

Comment ID 316bNFR.056.066

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Cost/Benefit Analysis

Recurring costs would include O&M costs, permit renewal costs, etc.

The total compliance costs for this rule should also include the efficiency penalty associated with operating a facility with recirculated cooling. Some facilities will choose adopt recirculated cooling to minimize the impacts of this rule on obtaining initial and renewal permits, and these costs are valid compliance costs.

EPA Response

EPA has considered all of the costs mentioned by the commenter. The analysis of the final rule fully considers the energy penalty associated with operating a facility with recirculated cooling. For a more detailed discussion of EPA's estimation of efficiency penalties, see the Technical Development Document. Also see the record for the rule.

Comment ID 316bNFR.056.067

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Cost
Electric Generation Sector

Number of facilities affected by this rule.

See comments for Section VI.B above. {see comment 316bNFR.056.019} The number of new generating facilities seems to be grossly underestimated. In addition, those facilities that choose to use recirculated cooling are doing so, in part, to avoid the requirements of meeting this rule, and therefore are incurring costs that associated with compliance to this rule.

EPA Response

See response to comment 316bNFR.042.003 and Chapter 5: Baseline Projections of New Facilities in the Economic Analysis document for information on EPA's projection of the number and cooling water characteristics of new in-scope electric generators. Also, see response to comment 316bNFR.056.019 which explains how EPA accounted for facilities that have changed their cooling system designs due to the final rule.

Comment ID 316bNFR.056.068

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Cost Impacts of Other Alternatives

EPRI has not had sufficient time to develop cost data for the various options EPA lists. Some of this data is being developed as part of a current review of dry cooling installations, with a final report due by 12/31/00. EPRI will provide EPA comments and data as they are available.

EPA Response

EPA notes that it received the draft report from the commenter on September 24, 2001, far after the close of the notice of data availability, which closed on June 25, 2001. Due to the very delayed submittal of the information, EPA was not fully able to consider the information therein. However, EPA was able to review the information and, based on an entirely surface level review, found no information to contradict the analyses and basis for the final rule.

EPA has no legal obligation to respond to such late comments. See e.g., Personal Watercraft v. Dept. of Commerce, 48 F.3d 540 (D.C. Cir. 1995). Nevertheless, EPA has attempted to respond to these comments to the extent possible.

Comment ID 316bNFR.056.069

Subject Matter Code	24.5
EEA - Estimation of Benefits	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

CWIS Impacts and Potential Benefits

An insufficient comment period was allowed to review each of the studies noted by EPA. If mortality was assumed as 100 percent and density-dependent functions were not included in the predictive analyses of population losses, the predictions are overestimated.

EPA Response

EPA did not analyze potential population-level consequences of impingement and entrainment for the new sources EEBA, and therefore this comment is not relevant See also discussion of population modeling in responses to comments 316bNFR.056.070 and 316bNFR.068.090.

Species that spawn in nearshore areas, have planktonic eggs and larvae, and are small as adults experience even greater impacts because both new recruits and reproducing adults are affected (e.g., bay anchovies in estuaries and oceans). In general, higher impingement and entrainment are observed in estuaries and near coastal waters due to the presence of spawning and nursery areas.

See introductory comments regards opportunistic fish strategies as exemplified by bay anchovy. EPRI does not understand how EPA concludes that these species experience even greater impacts. If such an analysis exists to support this statement, it should be presented. EPRI recognizes, however, that these species may experience greater impacts because all life stages are impinged and entrained. A definitive impact statement would require detailed analysis of how density-dependent response contributes to population and community level response.

The most common species impinged and entrained in the Chesapeake Bay is the bay anchovy. MD-PPRP concludes, however, that after nearly 25 years of study on the cumulative impacts of 13 power plants on the mainstem of the Bay, that no substantive population or community consequences have been observed (see introductory notes).

In general higher impingement and entrainment rates are observed in estuaries because estuarine fish generally have evolved life history strategies that involve production of extremely huge numbers of eggs and larvae to insure survival of the species. This life history strategy evolution has nothing to do with the presence of spawning and nursery areas. EPRI is not aware of any analysis that would indicate that on a relative basis there are more spawning and nursery grounds in estuaries and oceans than that which occur in freshwater systems.

EPA Response

This commenter agrees with EPA that estuarine fish species often experience greater impacts than species in other waterbody types because all life stages are impinged and entrained. However, the commenter argues that a “definitive impact statement would require detailed analysis of how density-dependent response contributes to population and community level response.” In response, EPA notes that it is not necessary to address potential population- or community-level responses to define environmental impacts of CWIS. Impingement and entrainment of aquatic organisms are, in themselves, environmental impacts. This is why for new facilities it is reasonable to establish available controls to reduce impingement and entrainment that are economically practicable and have acceptable non-water quality environmental impacts (including energy impacts). EPA also points out, as noted in Chapter 11 of the EEBA, that the purpose of EPA’s data compilation was to provide information on the relative magnitude of impingement and entrainment in different types of water bodies, not to evaluate potential indirect effects of CWIS on affected populations or communities. EPA notes that the models of power plant impacts on Chesapeake Bay fisheries referred to by the commenter have the same general limitations associated with all fish population models (see response

to Comment 316bNFR.068.090). These include uncertainties associated with (1) the high natural variability of fish recruitment, (2) measurement errors in the assessment of stock sizes and population parameters such as survival and reproductive rates, and (3) incomplete scientific understanding of the many physical and biological factors that interact in complex ways to affect fish population dynamics (Fogarty, M.J., A.A. Rosenberg, and M.P. Sissenwine. 1992. Fisheries risk assessment: sources of uncertainty. A case study of Georges Bank haddock. Environmental Science and Technology 26:440-447.). In the case of Chesapeake Bay, EPA is concerned about the current impairment of aquatic resources in the Bay and the inability of single species, single stressor population models to determine impacts of cooling water intake structures given the many complex interactions that occur among multiple species and multiple stressors within this system.

Comment ID 316bNFR.056.071

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 24.5

EEA - Estimation of Benefits

...tidal currents in estuaries can carry organisms past intakes multiple times, increasing their probability of impingement and entrainment.

The number of organisms impinged and entrained would depend solely on the density of organisms present in front of the CWIS, not on the number of times an individual organism is likely to move past the intake. In addition, if tidal action does move organisms past the intake multiple times, the end effect is a reduction in entrainment and impingement losses, because the same individuals are being entrained and impinged in a manner similar to partial recirculated cooling systems. It is a greater potential impact to the individual organism, but not to the overall population.

EPA Response

The commenter argues that the number of organisms impinged and entrained in estuaries depends solely on the density of organisms in front of the CWIS and not on the number of times individuals are carried past the intake. EPA points out that the commenter has misunderstood EPA's statement that "...tidal currents in estuaries can carry organisms past intakes multiple times, increasing their probability of impingement and entrainment." EPA's statement refers to the increased probability of impingement and entrainment resulting from increased exposure to CWIS. EPA's point is that as more individuals in the source population are exposed to the influence of an intake structure, and the same individuals are exposed multiple times, rates of I&E will increase. EPA notes that it is not necessary to address potential population-level responses to these losses, as the commenter suggests, in order to define the environmental impact.

Comment ID 316bNFR.056.072

Subject Matter Code 24.5

EEA - Estimation of Benefits

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

The second example...cost/benefit analysis for flow reductions at Hudson River plants

Boreman and Goodyear (1988), as cited by EPA, used the conditional mortality rate to estimate stock reductions. This approach assumes that density-dependent processes do not occur. As a result, the estimates are worst-case. Empirical evidence increasingly has noted the occurrence and importance of density-dependent processes (Rose et al. 2000). As Rose et al. (2000) note, density-dependence (compensation) must be included in management analyses that involve long-term predictions of fish populations. As they further note, the scientific community knows how to incorporate density-dependence into population dynamics and stock assessment models. The Boreman and Goodyear results, therefore, are outdated and. potentially, an extreme worst-case analysis.

EPA Response

The commenter objects to EPA's reference to studies that use reductions in conditional mortality rates of fish year-classes to estimate potential reductions in fish harvest. The commenter bases this objection on the argument that density-dependent compensation must be included in analyses involving long-term predictions of fish population size. EPA notes that the studies referred to do not attempt to predict long-term fish population dynamics. Rather, empirical data are used to quantify annual percent reductions in larval populations due to CWIS using the widely accepted Empirical Transport Model and these results are used by economists to predict related changes in fish harvest. EPA was citing peer-reviewed scientific and economic literature in providing this information. In response to the commenter's position that fish populations have "compensatory reserve" available to withstand impingement and entrainment losses without appreciable population impact, EPA concurs with many noted fisheries scientists that a population's potential "compensatory reserve" should not be evaluated apart from the ecosystem context within which the population resides and that environmental variability makes it necessary to evaluate potential density-dependent dynamics on a year-to-year basis (See, for example, Boreman, J. 2000. Surplus production, compensation, and impact assessments of power plants. Environmental Science & Policy 3:S445-S449.). In regard to the power plant impacts on Hudson River fish populations referred to by this commenter, EPA notes that the New York Department of Environmental Conservation maintains that potential compensatory responses to this level of power plant mortality could seriously deplete any resilience or compensatory capacity needed by these populations to survive other unfavorable environmental conditions that may occur (New York Department of Environmental Conservation. 2000. Internal memorandum provided to the USEPA on NYDEC's position of SPDES permit renewals for Roseton, Bowline Point 1 & 2, and Indian Point's 2 & 3 generating stations.)

Comment ID 316bNFR.056.073

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 24.5

EEA - Estimation of Benefits

An economic analysis estimated monetary damages under once-through cooling based on the assumption that annual percent reductions in year classes of fish result in proportional reductions in fish stocks and harvest rates

This assumption further results in a worst case analysis. More importantly, the assumption is probably wrong based on life history strategy information as discussed above (i.e., for periodic strategists such as striped bass). The assumption requires testing in specific locations and for specific species. EPA should note the consequences of the assumption, particularly that it results in a worst-case analysis.

EPA Response

This comment reiterates points made in Comment 316bNFR.056.072 and argues that the assumptions of the studies cited by EPA require testing in specific locations and for specific species. EPA concurs that tests of the studies' assumptions would be valuable. However, EPA disagrees that the assumption that reductions in fish stocks and harvest rates are proportional to year class reductions results in a "worst case analysis." If this assumption is not met, estimates could be higher or lower depending on the nature of actual relationships among year class size, stock size, and harvest rate in any particular case. For example, if a compensatory process operates, then the survival of recruits not lost to CWIS may increase, leading to increased recruitment to the harvestable stock. However, if a depensatory process operates, and a relatively constant number of recruits is removed, then the survival rate of recruits may decrease, depressing adult stocks. Indeed, the nature of such relationships may not be static, but rather may vary in response to climatic changes, altered trophic relationships, and other changes in the physical and biotic environment, and it is widely accepted by fisheries scientists that such variables must also be considered in evaluating potential density dependent processes.

Comment ID 316bNFR.056.074

Subject Matter Code	23.5
	Executive Orders

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Paperwork Reduction Act

No comment. Except that the estimated costs for the Source Water Body Baseline Characterization and Biological Monitoring are grossly underestimated.

EO 13158: Marine Protected Areas

This proposed rule recognizes that there are sensitive biological areas within tidal rivers, estuaries, oceans, and the Great Lakes that are more susceptible to adverse environmental impact from cooling water intake structures.

EPA notes "within"; however, all areas of tidal rivers and estuaries are noted as sensitive by EPA in previous sections. Based on EPA's definition of the littoral zone (using light penetration and occurrence of primary productivity), coastal oceans are sensitive to the beginning of the continental shelf. Only for the Great Lakes is there a reasonable context for "within."

EPA Response

Two issues are raised in this comment: (1) The commenter claims that the estimated costs for the Source Water Body Baseline Characterization and Biological Monitoring are grossly underestimated. (2) The commenter questions EPA definition of littoral zone.

(1) EPA reestimated the costs for the baseline characterization study and for biological monitoring for the final rule analysis. The reestimated costs are higher than at proposal. For the baseline characterization study, EPA increased the cost estimate from $12,000 for the proposal analysis to [***$234,000 - $293,100] for the final rule analysis. For monitoring costs, EPA increased the estimate from $68,000 - $79,000 for the proposal analysis to [***$74,000 to $106,000] for the final rule analysis.

(2) The final section 316(b) New Facility Rule no longer uses the concept of littoral zone in establishing compliance requirements.

Comment ID 316bNFR.056.075

Subject Matter Code	CP
Comment Period	

Author Name Kent Zammit

Organization Electric Power Research Institute (EPRI)

Solicitation of Comments and Data
See below.

Specific Solicitation

EPRI has submitted its comments; however, we note that insufficient time was allowed to address the extensive number of comments requested by EPA

EPA Response

Rather than requiring/defining a 99% "level of protection", Today's rule establishes technology-based performance requirements based on a two-track approach that reflects the best technology for minimizing impingement and entrainment impacts of a cooling water intake structure. The two track approach of the final rule allows site-specific evaluations in determining the appropriate technologies to be implemented.

EPA believes this final rule will significantly increase protection for aquatic communities, the Agency has determined that the proportional flow requirements represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA examined the performance of existing facilities based on data from the section 316(b) industry survey in terms of proportional flow to determine what additional value could be used as a safeguard to protect against impingement and entrainment (especially in smaller waterbodies, where multiple intakes are located on the same waterbody, or in waterbodies where the intake is disproportionately large as compared to the source water body). EPA found most existing facilities meet these requirements. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet these requirements.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William Creal

On Behalf Of:

State of MI, Dept. of Environmental
Quality, Surface Water Quality Div.

Author ID Number:

316bNFR.057

Comment ID 316bNFR.057.001

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name William Creal

Organization State of MI, Dept. of Environmental Quality, Surface Water Quality Div.

The foremost issue regarding cooling water intake structures is the determination of the level of impact upon biological communities and what level is considered to be acceptable. Historically, studies to define baseline biological communities for a waterbody completed in Michigan showed a high level of variability. These studies were conducted according to state guidance comparable to proposed Section 125.86. The variability in the biological communities paired with the vaguely defined term "adverse environmental impact" has caused difficulty in determining if the intake structure has a significant detrimental effect upon aquatic life. Today's proposal continues to avoid defining the key term "adverse environmental impact." A precise definition of this term that presents a threshold for what constitutes "adverse" is preferable to help provide a guideline for regulatory establishments.

EPA Response

Please see response to comment 316bNFR.009.001. The problems with population- or community-level approaches cited by the commenter are among the reasons EPA took a different approach in the new facility rule.

Comment ID 316bNFR.057.002

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name William Creal

Organization State of MI, Dept. of Environmental Quality, Surface Water Quality Div.

Suggestions offered in the Federal Register Preamble, Section VII D, that would provide clarity and consistency in implementing Section 316(b) include defining "adverse environmental impact" as the impingement or entrainment of one percent or more of the aquatic organisms as determined by the Baseline Biological Characterization Study. We support incorporating this definition in the rule.

EPA Response

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, today's rule does not interpret AEI in this fashion. Please see response to comment 316bNFR.029.013 and section VI.B.2.a of the preamble for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.057.003

Subject Matter Code 125.84.5

Director's Requirements

Author Name William Creal

Organization State of MI, Dept. of Environmental Quality, Surface Water Quality Div.

Intake velocity and flow requirements presented in the proposed rule seem appropriate and would aid in consistent regulation of new facilities. A rule framework that resembles the United States Environmental Protection Agency's proposed rules from the 1970s that implements Section 316(b) on a case-by-case, site-specific basis, would perpetuate difficulties that have been encountered when applying the rule in the past. Sections 125.84(f) and 125.84(g) of the proposed rule provide sufficient flexibility to address unique situations where additional control measures are appropriate.

EPA Response

EPA concurs with the commenter.

The historical case-by-case approach requires significant resources on the part of the regulatory authorities that must implement section 316(b) requirements. Demonstration studies are complex and may take years to complete. The iterative nature of the assessment process requires a significant expenditure of resources by both industry and the regulating authorities. The case-by-case approach may also lead to less consistent permitting decisions than if there were national requirements, making planning more difficult for industry and leading to uncertainty from permitting authorities with respect to appropriate requirements for a given type of facility sited under a given type of conditions.

As such, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

Also see Sections II.C. and IV.B in today's final rule and Section VIII.A. in the proposed rule for further explanation as to why the case-by-case approach was rejected.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Mildred F. Kriemelmeyer

On Behalf Of:

Maryland Conservation Council

Author ID Number:

316bNFR.058

Comment ID 316bNFR.058.001

Author Name Mildred F. Kriemelmeyer

Organization Maryland Conservation Council

Subject Matter Code 9.3

Documentation of I & E Impacts

The adverse environmental effects of cooling water intake structures are significant, causing the loss of large numbers of aquatic species. By and large, EPA and state permitting agencies have not used their regulatory control to significantly reduce the profound environmental effects of intake structures.

EPA Response

EPA agrees that cooling water intakes do pose a threat to aquatic resources, and because EPA's mission includes ensuring the sustainability of communities and ecosystems, EPA is acting to minimize that threat through this rule.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.058.002

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Mildred F. Kriemelmeyer

Organization Maryland Conservation Council

It makes compliance with 316(b) a function of whether the water is adjacent to an EPA-defined littoral zone, which ignores the Clean Water Act's broad application to some waters EPA deems compliance worthy.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.058.003

Author Name Mildred F. Kriemelmeyer

Organization Maryland Conservation Council

Subject Matter Code 10.01

Regulatory Framework Options

It's approach is contrary to the language, purposes and intent of 316(b), and functionally waives the Best Technology Available (BTA) requirement. The BTA now is dry cooling technology that reduces adverse environmental effects in excess of 99 percent. Yet the Proposed Rule would not require intake structures at new sources to comply with 316(b) at a level that reflects dry cooling, despite direct Congressional mandate.

EPA Response

For the reasons discussed in Section V.C of today's rule EPA is not adopting dry cooling as the BTA for minimizing adverse environmental impact. Also see response to comment 316bNFR.006.001. Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities.

For the reason described in response to comment 316bNFR.053.001 EPA believes that a formal cost test is appropriate in determining "best available commercially at an economically practicable cost. EPA believes that while the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so at a cost that is more than three times the cost of wet cooling. Therefore, EPA does not find it to represent the "best technology available" for minimizing adverse environmental impact. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Comment ID 316bNFR.058.004

Author Name Mildred F. Kriemelmeyer

Organization Maryland Conservation Council

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

It curtails the definition of intake structures both physically, from the point water is withdrawn to the first pump or series of pumps, and according to water usage distribution (must use 25 percent of intake water for cooling) contrary to Congressional mandate.

EPA Response

See response to 316bNFR.053.016 and 316bNFR.053.017.

Comment ID 316bNFR.058.005

Author Name Mildred F. Kriemelmeyer

Organization Maryland Conservation Council

Subject Matter Code 18.1

Elimination of "Wholly Disproportionate" Cost Test

It's cost/benefit tests fail to apply a wholly disproportionate cost test that focuses on the marginal cost of compliance to the ratepayer as the comparative basis for analysis and tail to account for the external, i.e., environmental, benefits of BTA.

EPA Response

EPA has considered the issues raised in the comment. For technology based rules such as the final section 316(b) New Facility Rule, EPA believes that the economic practicability test, not the wholly disproportionate test, is most appropriate for BTA determination. See the preamble to the final rule and the response to comment 316bNFR.206.014. For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable.

For further information on EPA's position on use of the "wholly disproportionate" test for BTA determination, see EPA's response to comment 316bNFR.052.009 above.

Comment ID 316bNFR.058.006

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Mildred F. Kriemelmeyer

Organization Maryland Conservation Council

It allows the use of mitigation measures as a substitute for compliance with BTA, in spite of the fact that Section 316(b) does not allow mitigation to be used as a substitute for BTA.

EPA Response

See preamble sections V.B.2.f and VI.L for discussions on the basis and role of restoration under today's final rule. See 316bNFR.210.021.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Russell J. Baker

On Behalf Of:

Omaha Public Power District (OPPD)

Author ID Number:

316bNFR.059

Comment ID 316bNFR.059.001

Author Name Russell J. Baker

Organization Omaha Public Power District (OPPD)

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

The new rules should provide for a site-specific assessment of individual sites where CWIS's will be placed. This need not be the exclusive means of making a § 316(b) decision, but it should be one option available to the permittee. Likewise, the concerns of local and regional communities should be respected and considered in making a determination under section 316(b). OPPD suggests that EPA encourage, respect, and ultimately delegate authority for 316(b) decisions to state governments and local interests.

As an alternative, available in conjunction with the site-specific approach, it would be appropriate for EPA to recognize that certain CWIS technologies will minimize appreciable risk of adverse environmental impacts (AEI) in most cases. Therefore, EPA should authorize permit writers to use streamlined procedures to make site-specific BTA decisions more expeditiously, where the approved technologies or characteristics are present.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. Most 316(b) permitting decisions are made by permitting authorities in the 44 NPDES authorized States.

Comment ID 316bNFR.059.002

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Russell J. Baker

Organization Omaha Public Power District (OPPD)

As the fundamental purpose of Section 316(b) is to minimize "adverse environmental impact," regulations which look to achieve this objective cannot be implemented in the absence of a definition of or establishment of criteria for determining "adverse environmental impact." Therefore, Public Power believes that EPA should establish this essential definition or establish criteria to be used in making the determination.

EPA Response

Please see response to comment 316bNFR.009.001.

Comment ID 316bNFR.059.003

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name Russell J. Baker

Organization Omaha Public Power District (OPPD)

Section 316(b) authorizes EPA to only regulate cooling water intake structures, not entire cooling systems. As such, alternative technologies should not be eliminated nor investigated. OPPD resolves that once-through cooling is a viable technology that should remain an option for generation facilities. Once through-cooling systems are the most economical to construct, allow for more efficient power generation, and have a most important environmental benefit not considered by EPA, namely its nonconsumptive use of water. OPPD believes that the regulations should provide facilities with the ability to make decisions on the type of cooling water system to be employed and should not eliminate alternate, viable technologies.

EPA Response

Regarding EPA's authority to regulate flow as a requirement related to EPA's authority to regulate the capacity of cooling water intake structures, see response to comment 316bNFR.205.002. EPA rejected once through technology as the technology basis for the rule because there are more effective technologies for reducing impingement and entrainment that for new facilities are technically available and economically practicable. EPA's second track, however, allows for the use of any technology suite that results in comparable reductions in impingement mortality and entrainment to the same level as the Track 1 requirements.

Finally, EPA considered the consumption of water used under a wet cooling system and found this volume of water to be acceptable. See response to comment 3168NFR 068.100. As stated elsewhere in the rulemaking record, based on information about planned new facilities in the rulemaking record, only nine facilities are expected to change the type of cooling system they use from once through to wet cooling as a result of this rule. Overall, this does not result in significant water consumption nationwide. EPA has information in the record showing that once through system also consume water - due to the evaporation that occurs of the heated water discharged. See 2-037-R9 in the Docket.

Comment ID 316bNFR.059.004

Author Name Russell J. Baker

Organization Omaha Public Power District (OPPD)

Subject Matter Code 18.0

Best Technology Available-Cost Considerations

The legislative history of § 316(b) makes clear that costs must be considered in deciding what intake structure technology is the "best available." OPPD urges EPA to use a reasonable and verifiable cost estimate in determining "best available technology" as well as determining the impact of the proposed regulations.

EPA Response

This comment is identical to comment 316bNFR.043.006. Please refer to EPA's response to comment 316bNFR.043.006.

Comment ID 316bNFR.059.005

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Russell J. Baker

Organization Omaha Public Power District (OPPD)

OPPD believes that the design intake flow limit proposed by EPA is an arbitrary cutoff and does not further the objectives of section 316(b). EPA has not provided any support for the establishment of a two million gallon per day (MGD) cutoff. OPPD believes that this threshold will impose unnecessary and unjustified costs on smaller entities or on entities which are already incurring significant costs due to the inclusion of cooling towers in their system, designed, in part, to minimize any adverse environmental impacts. If such limits are deemed to be necessary, OPPD would argue that a much higher threshold would be appropriate, perhaps 20 MGD. EPA's own estimates indicate that a 25 MGD threshold would subject up to 99.1 percent of all cooling water flows to the proposed rules, thereby achieving the overall objectives of the regulation.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA has concluded that the compliance costs for this rule are economically practicable and achievable for the industries affected. EPA does not consider that the cost of the rule would be a

barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available.

For further discussion of these points, see Sections VI.A.3. of the preamble to the final rule and the Economic Analysis.

Comment ID 316bNFR.059.006

Author Name Russell J. Baker

Organization Omaha Public Power District (OPPD)

Subject Matter Code 15.11

Mandatory Approaches

OPPD believes that EPA does not have the authority to mandate the use of compulsory mitigation measures or continuous monitoring. However, OPPD does believe that there is a role for voluntary mitigation measures as an alternative option for the minimization of adverse environmental impacts.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kaitilin Gaffney

On Behalf Of:

Center for Marine Conservation

Author ID Number:

316bNFR.060

Comment ID 316bNFR.060.001

Author Name Kaitilin Gaffney

Organization Center for Marine Conservation

Subject Matter Code SUP

General Statement of Support

Of particular concern to CMC are cooling water Structures that draw from coastal waters including estuaries, tidal rivers, and the open ocean. CMC strongly supports the immediate adoption of additional regulations to minimize the impacts of CWISs for new facilities and encourages EPA to move quickly to adopt additional regulations governing existing operations. Although CMC is generally supportive of the intent behind the proposed regulations, we are concerned that the regulations are not sufficiently protective and that there is inadequate support for the distinction between the levels of protection provided to littoral versus non-littoral ocean waters.

EPA Response

EPA appreciates your concerns as to whether the proposed regulations were reflect best available technology for minimizing adverse environmental impact and whether there is adequate support for the distinction drawn between littoral and non-littoral areas. In developing this final regulation, EPA has paid particular attention to both of these general concerns. Please refer to specific comment/responses addressing specific aspects of these concerns.

Comment ID 316bNFR.060.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kaitilin Gaffney

Organization Center for Marine Conservation

The Proposed Regulations Should Require Avoidance of Impacts

As noted in the proposed regulations, power plants and industrial facilities in the United States withdraw approximately 70 trillion gallons of water from U.S. waters each year, destroying vast quantities of aquatic organisms annually, including phytoplankton, zooplankton, fish, shellfish, and many other forms of aquatic life. There are numerous documented cases of environmental harm caused by cooling water intake structures all across the county. Because CWISs remove large volumes of water (and organisms) from extremely complex ecological systems, the nature and severity of CWIS impacts are difficult to estimate. Even impacts of existing facilities, many of which have been operating for decades, are often not well understood.<FN 1> Given the ecological importance of source water environments, the uncertainty involved in impact assessment particularly at the ecosystem scale, and the availability of feasible technological alternatives to use of cooling waters (as demonstrated by the increasing number of new facilities employing dry- cooling technologies), CMC urges EPA to adopt regulations that avoid, rather than merely reduce, intake impacts.

Footnotes

1 For example, during the Moss Landing Power Plant expansion process, the California Energy Commission acknowledged that secondary entrainment impacts were significant but concluded that there "is no way to determine the number of entrained species which would otherwise be food for birds, and other higher species.'" California Energy Commission, August 2000, Presiding Members Preliminary Decision for the Moss Landing Power Plant Project at 165.

EPA Response

EPA interprets the use of the word “minimize” in CWA section 316(b) to give EPA discretion to consider technologies that reduce but do not completely eliminate impingement and entrainment as meeting the requirements of section 316(b) the CWA. The final rule establishes the best technology available for minimizing adverse environmental impact on the basis of what EPA determined to be an economically practicable cost for the industry as a whole.

Comment ID 316bNFR.060.003

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

Author Name Kaitilin Gaffney

Organization Center for Marine Conservation

Distinction Between Littoral and Non-Littoral Ocean Waters

EPA's proposed regulations regarding cooling water intake structures apply more protective standards to ocean waters within the littoral zone than waters beyond the littoral zone. According to the proposed regulations, where a CWIS is located within the littoral zone in the ocean, intake flows must be reduced to "a level commensurate with that which could be attained by a closed- cycle recirculating cooling water system, " and the facility must "implement additional technologies that minimize impingement and entrainment of fish eggs and larvae and maximize survival of impinged adult and juvenile fish." These requirements do not apply to a CWIS located outside of the littoral zone. CMC believes this distinction to be arbitrary and scientifically unsupported. Accordingly, we request that the distinction between standards for littoral and non- littoral ocean waters be withdrawn from the regulations, and that all ocean waters receive the fullest protection from the potential adverse effects of CWISs.

EPA's distinction between littoral and non-littoral ocean waters appears to be based on the inaccurate and long disproved assumption that deeper ocean waters are devoid of significant life and therefore that the area beyond the littoral zone would not be adversely affected by a CWIS. In fact, ocean habitats at depths below the littoral zone support a wide diversity and abundance of life. In cold water regions, the littoral zone ends in relatively shallow waters. For example, in California, the littoral zone may extend to areas only a hundred feet deep; the mesopelagic environment beyond the photic zone contains abundant marine life, which would be vulnerable to a CWIS located in waters beyond the littoral zone.

Diverse benthic fish associations have been documented in deep waters off of the West Coast (Stein et al. 1992; Yoklavich et al. 2000). A wide diversity of infaunal invertebrate species is also found in depths beyond the littoral zone. Studies performed at depths greater than 50 meters in the Monterey Bay and off of San Francisco reported over 300 infaunal invertebrate species each (Hodgson and Nybakkan. 1973; Nybakkan et al. 1984). Furthermore, much of the planktonic productivity in the California Current Ecosystem is well offshore at the shelf margin, and much of the recruitment success of a wide range of ichthyoplankton species depends upon finding and feeding upon concentrated patches of phytoplankton. A CWIS drawing intake waters from well beyond the littoral zone could still have significant ecological impacts.

Even primarily surface oriented species may spawn at depth and thus be vulnerable to intake beyond the littoral zone. Many organisms, including both coral reef and kelp forest species, employ strategies that intentionally send larvae off shore for development and then recycle them back to shore for successful recruitment. The many organisms with larvae that spend critical periods offshore would be vulnerable to intake by a CWIS. Species found beyond the littoral zone also have tremendous economic value; most commercial fisheries in the U.S. now occur outside the littoral zone.

Furthermore, the life histories of many ocean species, including economically significant species, are

still unknown. This is particularly true of species that reside or spawn in deeper waters as relatively few studies have been done of such environments. Unidentified species that reside or spawn in areas beyond the littoral zone would also be subject to intake impacts but are unaccounted for in the proposed regulations. Secondary impacts resulting from intake are also poorly understood but may be significant, particularly in situations where threatened or endangered species are affected. EPA's proposed regulations should be based on a precautionary approach that provides protection in the case of uncertainty or incomplete scientific knowledge. Because relatively little is known about species, assemblages, and ecological processes beyond the littoral zone, EPA should ensure that the proposed regulations are suitably conservative and reflect a precautionary approach.

EPA must provide a scientific justification for use of the littoral zone as the dividing line between facilities required to dramatically reduce water intake and those that do not. If the EPA intends to rely on this distinction, it should provide an analysis of the relative proportion in both number and abundance of species, found above and below the littoral zone throughout U.S. waters. EPA should demonstrate what proportion of species (in both number and abundance) would be protected at various depths above and below the littoral zone. EPA should then provide a reasonable justification as to why the proportion of species and abundance that will be protected using the littoral zone as the cut-off is appropriate. Absent such evidence, use of the littoral zone as the dividing line between ocean environments that deserve greater protection and those that do not, appears to be arbitrary and based more on convenience than on science.

Finally, if the littoral zone is used as the dividing line, the proposed regulations should take into account that an intake pipe located below the littoral zone may still draw from surface water depending on currents and hydrology. Therefore, any regulations designed to prevent intake of littoral waters should address potential surface water impacts and include a requirement that the intake pipes be located at a depth at least twice that of the littoral zone, or sufficient to insure that waters are not drawn from within the littoral zone.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.060.004

Author Name Kaitilin Gaffney

Organization Center for Marine Conservation

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

CMC urges EPA to require new facilities to use dry-cooling technologies to avoid adverse impacts associated with CWISs.

EPA Response

EPA rejected dry cooling as best technology available for the reasons described in Section V.C of the preamble to the final rule.

Comment ID 316bNFR.060.005

Subject Matter Code 10.014

Ocean--Proposed Standards

Author Name Kaitilin Gaffney

Organization Center for Marine Conservation

CMC specifically requests that all ocean waters be given the highest level of protection.

EPA Response

EPA is setting the same performance-based technology requirements for oceans as for all other waterbodies under Track I of the final rule. To the extent that site-specific characteristics of a proposed facility location make the Track I requirements more or less effective at reducing impingement and entrainment, the facility choosing to pursue Track II will have a site-specific goal for evaluating the efficacy of alternative technologies and approaches.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Alan E. Gaulke

On Behalf Of:

American Electric Power

Author ID Number:

316bNFR.061

Note

Fully supports the comments made by UWAG (316bNFR.068)

Comment ID 316bNFR.061.001

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Alan E. Gaulke

Organization American Electric Power

AEP has a strong interest in the proposed rule, because it will have a significant impact on future power plant designs and costs. AEP is filing these comments and endorsing the Utility Water Act Group comments because EPA has misinterpreted the meaning of Section 316(b), failed to identify and define adverse environmental impact, and has based their proposed rule on a flawed understanding of intake technology and the interaction of intakes with aquatic organisms. EPA must rewrite the proposed rule such that it:

* be written within the bounds of the current state-of -the-art, for intake technologies,
* protects aquatic populations and communities,
* is cost effective, and
* is implementable by regulators.

EPA Response

EPA believes that the final rule published today is within the bounds of the current state-of -the-art for intake technologies, does protect aquatic populations and communities, is cost effective, and is implementable by regulators. EPA believes the two-track technology-based approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing new facilities. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

EPA also believes that the approach represents the best technology available for minimizing adverse environmental impact and protecting aquatic populations and communities, and is more reasonable from an implementation standpoint. EPA has determined that with respect to new facilities, the technologies used as the basis for this approach are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts. EPA finds that the requirements contained in the preferred two-track approach also meet the requirement of section 316(b) of the CWA that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. With this approach the permit writer does not have to determine what the potential AEIs are for a particular permittee just whether the facility is proposing technologies that will meet the performance requirements in Section 125.84.

Comment ID 316bNFR.061.002

Subject Matter Code 10.0

Best Technology Available

Author Name Alan E. Gaulke

Organization American Electric Power

Intake Engineering

As currently written, the rule prevents engineers from selecting an intake structure technology that fits the limitations of the environment into which the intake will be located and it does not accommodate the water needs of the facility. The severe limitations placed on intakes by the flow and velocity of the source water body alone, limit the list of intake types an engineer can consider for a new facility. Many intakes cannot be used in all situations. In addition to protecting aquatic organisms, intakes must survive ice, debris, water level fluctuations, corrosion, and must not interfere with boat traffic. This last point is especially germane to submerged intakes.

EPA Response

EPA selected the two-track approach to allow engineers more flexibility to select intake structure technology most appropriate for their site. EPA's record demonstrates that the requirements of the rule would be met by many planned new facilities independently of the final rule. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. This approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of also allowing flexibility by including a performance-based alternative.

Comment ID 316bNFR.061.003

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Alan E. Gaulke

Organization American Electric Power

Protection of Aquatic Resources

This is not a platitude. AEP is a corporation committed to the development of scientifically and economically sound regulations and to compliance with these regulations. Our facilities are often located on water bodies heavily used for recreational and commercial fishing and boating. The U.S. Army Corps of Engineers, U.S. Coast Guard, and state agencies regulate our intakes for safe navigation. AEP complied with the Section 316(b) regulations as implemented by the states and regional offices of the EPA. All of AEP' s cooling water intakes evaluated under Section 316(b) have been approved as best technology available.

EPA Response

EPA applauds AEP’s commitment to the protection of aquatic resources.

Comment ID 316bNFR.061.004

Subject Matter Code 21.0

Cost/Benefit Analysis

Author Name Alan E. Gaulke

Organization American Electric Power

Cost Effectiveness

AEP is committed to working with regulators to achieve the goals of environmental protection in a cost-effective manner. The rule as proposed has enormous room for improvement.

EPA Response

EPA disagrees with the comment as the commenter fails to specify how the rule is in need of improvement. The final rule establishes national technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities. The national requirements establish the best technology available for minimizing adverse environmental impact associated with the use of these structures. The final rule establishes these requirements based on a two track approach which allows new facilities the freedom to determine the most cost-effective approach to achieving compliance.

Comment ID 316bNFR.061.005

Subject Matter Code MISC

Miscellaneous Comment

Author Name Alan E. Gaulke

Organization American Electric Power

Implementable by Regulators

The rule as written achieves the goal of being implementable by regulators at the expense of sound science, engineering judgment, and economic principles. Permitting delays, protracted negotiations, and litigation add unwanted and unnecessary cost burdens to new facilities. Achieving an implementable regulation at the expense of sound science, engineering judgment, and economic principles will add potentially greater costs than those received by permitting delays, protracted negotiations, and litigation. EPA must rewrite this rule to accommodate proper review of 316(b) issues by qualified engineers, economists, and ecologists in the regulatory agencies.

EPA Response

EPA's record supports that the final rule is scientifically based, technically sound, protective of aquatic resources, and technically available and economically practicable. In addition, the final rule balances the ease of implementation for regulators with the cost burden of permitting delays, protracted negotiations, and litigation for new facility applicants. Please see response to comment 316bNFR.023.011.

Comment ID 316bNFR.061.006

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Alan E. Gaulke

Organization American Electric Power

The proposed rule miss-identifies Donald C. Cook Nuclear Plant as causing adverse environmental impact

The proposed rule for cooling water intake structures (Fed. Reg. 65(155): 49060-49121) cites a research report on Donald C. Cook Nuclear Plant impingement losses as a sample of environmental impacts. (Cook Nuclear Plant is located on Lake Michigan near Bridgman, MI and is owned and operated by a subsidiary of American Electric Power. EPA cites Special Report No.115 from the University of Michigan, Great Lakes Research Division (FR 65:49073, first column, footnote No.13), as the source of their statement that one million fish were lost at the Cook Nuclear Plant in a three-week period. EPA accurately cited the data in the study report, but incorrectly interprets this impingement event as an example of adverse environmental impact. This was not the conclusion of the report. Likewise, the Michigan Water Resources Commission and the Michigan Department of Natural Resources, after reviewing all, or portions of, the 59 University of Michigan research reports on the 10-year study of the impacts of the Cook Nuclear Plant on Lake Michigan, concluded that the plant intakes were best technology available (minutes of the regular monthly meeting of the Michigan Water Resources Commission, November 19, 1987).

"EPA conceptualized adverse environmental impact in a manner that would not characterize the threshold for being considered “adverse” as the impingement or entrainment of a single organism, but also would not result in a threshold that is so high that it would allow for the impingement or entrainment of millions of organisms, larvae, or eggs" (FR 65:49074, middle column). This quote from the proposed rule will regulate new intake structures to a higher standard than is necessary to protect aquatic populations. EPA's concept of adverse impact reflects the "seat-of-the-pants" approach to defining adverse environmental impact used by regulators in the 1970's.

In the context of our daily lives, one million is a large number and impingement or entrainment of one million organisms seems like a loss should qualify as an adverse environmental impact. Placed into the context of the Lake Michigan ecosystem, one million fish impinged in three weeks is not necessarily evidence of adverse environmental impact. These one million fish were almost all alewives, an exotic species native to the Atlantic Ocean that entered the Great Lakes through the St. Lawrence Seaway. Alewives were considered an undesirable species in the Great Lakes during the 1960s through most of the 1970s. When this species entered the Great Lakes, there were no natural predators to control its numbers. The alewife population grew until there were too many for the lake ecosystem to support. In the late 1960s and early 1970s, billions of alewives died each spring and washed up onto the shores of Lake Michigan. The decaying alewives caused a severe health problem and cities, such as Chicago and Milwaukee, spent hundreds of thousands of dollars to remove rotting alewives from city waterfronts (Greenwood, 1970).

In the early 1970s, states bordering Lake Michigan began stocking predatory fish species in the lake to reduce the alewife population. When Cook Nuclear Plant impinged the one million alewives in three weeks, the alewife population had been reduced, but it was still the most abundant species in the lake.

One positive result of the reduced alewife population was the increase in the yellow perch population; perch are a highly prized game fish. Alewives indirectly compete with yellow perch for food and thus the large alewife population suppressed the yellow perch population.

Another way of putting the impingement of alewives at Cook Nuclear Plant into perspective is to compare the impingement losses with the predation losses. About 70% of the impinged fish at Cook Nuclear Plant are alewives. Published estimates of alewife consumption by predatory fish show that the Cook Nuclear Plant annual impingement is only a fraction of that figure. Estimates of alewife biomass in Lake Michigan from 1973 to 1978 ranged from 44,900 to 114,400 metric tons (estimated biomass of adult alewives available to bottom trawls at depths between 9 and 110 meters in Lake Michigan) (Hatch, et al., 1981). Salmonid predation on alewives in the late 1970s and the early 1980s was estimated at about 25,000 to 30,000 metric tons (Stewart, et al., 1981; Stewart, et al., 1983). The annual total alewife impingement at Cook Nuclear Plant was about 58 metric tons (2.3 million alewives) or about 0.2% of the amount of the salmonid predation.

The actual 316(b) adverse environmental impact assessment conducted by the Michigan Department of Natural Resources and the Michigan Water Resources Commission was more comprehensive than the few points illustrated in the preceding paragraphs. These paragraphs illustrate that while the number of entrained or impinged fish can appear to be an example of adverse environmental impact, when compared with the populations affected, the numbers of fish are relatively small.

EPA Response

The reason EPA is using impingement and entrainment as the metric for determining BTA for minimizing adverse environmental impact at new facilities is explained in the preamble to the final rule and elsewhere in this comment response document. EPA notes that the determination by Michigan was made almost 15 years ago, prior to the current rule making effort and does not reflect the current considerations under today's rule. Also, EPA would note that today's rule is for new facilities only and requires best technology available to minimize adverse environmental impact for new facilities, not existing.

EPA disagrees with the commenter's statement that the Agency used the "seat-of-the-pants" approach to defining adverse environmental impact used by regulators in the 1970's. EPA has stated that the Agency used the best data available and that existing and historical studies provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. Further, EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes.

With respect to the commenter's concerns about nuisance species, EPA agrees that they are an environmental problem. Cooling water intake structures, however, do not discriminate as to the organisms they impinge and entrain. Thus, EPA does not believe that the presence of nuisance species absolves new facilities from installing best technology available to minimize adverse environmental impact.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling

water intakes and discussion of issues raised by this comment please see Response to Comment 316b.NFR.529.301, 316bNFR.056.005, 316bNFR.068.050, 316bNFR.056.029, and sections III and VI.B of the preamble.

Comment ID 316bNFR.061.007

Subject Matter Code	13.1
Requirement of 0.5 fps	

Author Name Alan E. Gaulke

Organization American Electric Power

The cooling water intake velocity criterion rational is flawed

"EPA considers velocity to be one of the more important factors that can be controlled to minimize adverse environmental impact at cooling water intake structures" (FR 65(155):49087, right column). EPA follows this statement with an attempt to justify their selection of 0.5 feet per second (fps) as a national intake water velocity criterion to be applied to all future intakes. In their analyses, EPA failed to properly evaluate intake technology and ignored fish behavior in their analysis of the role velocity plays in fish impingement and entrainment. The utility industry trade association has filed extensive comments on the proposed velocity section. AEP fully endorses those comments. The following comments are intended to emphasize key issues regarding intake velocity.

A fish in the vicinity of an intake structure must receive a cue from its surroundings that elicits an avoidance response. Once that cue has been received by the fish, then and only then, is that individual fish's swimming ability in relationship with the intake velocity important. EPA's entire analysis evaluated only swimming ability. EPA failed to consider fish behavior as a factor in their analysis for selection of an intake velocity criterion. One intake design, which is often used in lakes and oceans, called a velocity cap, uses a rapid increase in velocity as a cue for fish to avoid the intake. The velocity cap is a flat "roof' over the top of the intake pipe, which is positioned vertically. The velocity cap serves two functions. It prevents surface vortices and creates a zone around the intake of rapid water velocity increase. This velocity increase is essential for the fish to detect the presence of the intake and avoid the area. Intake velocities at these intake types are well above 0.5 fps. Limiting a velocity cap type intake to 0.5 fps would increase, rather that reduce, impingement.

EPA failed to recognize that an intake velocity criterion is meaningful for only one type of commonly used intake design. For a through-screen, or an approach velocity criterion to be meaningful, the screen must be located such that it is the first component of the cooling water intake system (CWIS) the organism encounters. Profile screens (also known as Johnson screens and Johnson wedge-wire screens). are the only cooling water intake designs commonly in use today, and likely to be used at future intakes, meeting this condition. Profile screens are not a universally usable technology. They are not acceptable for all waterbody types and for all cooling water needs.

The selection of a cooling water intake system for a new facility must take into account the aquatic species and life stages to be protected, waterbody type, and limitations caused by the physical conditions to which the intake will be subjected, e.g., ice, debris load, water depth, and commercial and recreational navigation. Many factors could eliminate profile screens from consideration at a particular site. If the new facility must install an intake similar to the designs commonly in use, then the application of a through-screen or screen approach velocity criterion would be meaningless. A very commonly used cooling water intake design consists of an unscreened entrance, a screen (know as trash racks) to remove large debris, followed by a finer meshed screen (which is usually movable for cleaning purposes and known as traveling water screens) for removing small debris. Applying the velocity criterion at the trash rack or the traveling water screen is meaningless. Once an organism has

entered the CWIS, even if it has the swimming speed and stamina to exit the system, it is by random chance that the organism will find its way out of the CWIS. Organisms inside the CWIS are like a dog tethered to a tree on a long lead; once the dog wraps the lead around the tree, the dog can not "figure out" how to unwrap the lead. Some fish may have the innate sense to swim upstream when they encounter a blind alley while moving downstream, but no aquatic organisms will "figure out" how to exit the CWIS.

In short, an intake velocity criterion has very limited value for regulating cooling water intake structures. An acceptable intake water velocity should be determined for the intake type, source-waterbody species, and physical conditions on a site-specific basis. A more complete discussion of fish swimming performance and the role it plays in assessing the potential for impinging and entraining aquatic organisms was sent to Ms. D. Nagle (1998).

EPA Response

The final rule provides two avenues for compliance with the requirements. Under Track I, facilities must design and operate their facility to ensure that intake velocity (as measured by through screen velocity) does not exceed 0.5 ft/s. See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.001.001 for information on the intake configuration.

See response to comment 316bNFR.206.116 for information on avoidance behaviors of fish at intakes.

Also see 316bNFR.068.080, 316bNFR.068.081, 316bNFR.068.082, 316bNFR.068.106, 316bNFR.068.107, 316bNFR.524.037, 316bNFR.524.038, 316bNFR.524.039, 316bNFR.524.040, 316bNFR.524.041, and 316bNFR.524.042.

Comment ID 316bNFR.061.008

Author Name Alan E. Gaulke

Organization American Electric Power

Subject Matter Code 10.0

Best Technology Available

Table 1 is a list of AEP power plants, the cooling system and intake type, and the date of the Section 316(b) study. All of the power plants on which studies were done, the regulatory agency determined the intakes were best technology available.

EPA Response

The final rule published today applies only to new facilities as defined in Section I.A. of the preamble. Furthermore, the permit decisions referenced above were made prior to establishment of national Section 316(b) requirements. See proposed rule Section VIII.A.1 and final rule Section II.C.4 for discussions on the limitations of the existing 316(b) permitting approach. See the preamble to the final rule, the economic analysis and the technical support document for a discussion about how the detailed questionnaires issued to existing facilities were used to project certain characteristics for new facilities. The data that was provided by the commenter is data on existing facilities and was not applicable to this final new facility rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Theresa Pugh

On Behalf Of:

American Forest & Paper Assn.

Author ID Number:

316bNFR.062

Note

Comments included a table that was scanned as an attachment (316bNFR.062_Table, and an appendix 316bNFR062_Appendix)

Comment ID 316bNFR.062.001

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Please note we have identified some unintended air pollution consequences from the 316(b) proposed rule for New Facilities. If the New Facility rule were to be promulgated as drafted, the forest products industry would see an increase in SO2, NOx, PM, and CO2 emissions due increased energy demand to run the mills.

EPA Response

See response to comment 316bNFR.062.016.

Comment ID 316bNFR.062.002

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 24.4

EEA - Estimation of Regulatory Alternative Costs

Although we don't anticipate significant new construction for our industry, it is possible the New Facility rule would affect more than new "greenfield" facility construction given some definitions dealing with applicability. We would hate to see the energy consequences (from lost heat efficiencies) resulting from new recirculating cooling towers discourage investment for New Facilities. Our belief is that these costs would exceed the costs of BTA if recirculating cooling towers were required for New Facilities.

Future cogeneration construction (and possible CWIS) is the second biggest area of concern in terms of the likelihood to accidentally trigger New Facility requirements. Although we only imagine one of two "greenfield" facilities constructed over the next decade, we could envision dozens of companies adding cogeneration sources (that might need a new CWIS). Our industry is the largest user and producer of cogenerated heat and power. We anticipate continued growth in the use of cogeneration and do not want to discourage this form of power generation. Not only is the energy critically needed for our industry and for those who sell back to the grid, the energy is created through biomass -- essentially an environmentally benign form of energy.

EPA Response

The final section 316(b) New Facility Rule applies to only “greenfield” and “stand-alone” facilities. A greenfield facility is a facility that is constructed at a site at which no other source is located, or that totally replaces the process or production equipment at an existing. A stand-alone facility is a new, separate facility that is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same. Therefore, under the final rule, facilities adding co-generation would be included in the definition of new facility only if the co-generation facility is a separate and independent operation and the cooling water intake structure used by the original facility is modified by constructing a new intake bay for the co-generation facility or is otherwise modified to increase the intake capacity of the cooling water intake structure. Otherwise, such facilities will be regulated under Phase III of the section 316(b) regulations.

Comment ID 316bNFR.062.003

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

EPA Should Set an Appropriate Threshold for Rule Applicability.

AF&PA has met with EPA to discuss suggestions for the use of a threshold approach to the 316(b) regulatory program for both New and Existing Facilities. Although the forest products industry does not anticipate substantial numbers of new plants constructed at "greenfield" sites over the next decade, AF&PA strongly urges the EPA to promulgate a final rule for New Facilities which utilizes an appropriate threshold approach for applicability.

An appropriate threshold for application of the 316(b) rules for new facilities should avoid applying burdensome procedures to thousands of intake structures with little or no potential for causing adverse environmental impacts. The two million gallons per day (MGD) applicability cutoff, which EPA has proposed, is too low to accomplish this task. As explained below, structures that provide for intake volumes considerably larger than 2 MGD commonly fall into the category of those that do not adversely affect the environment.

There are probably tens of thousands of cooling water intake structures in the United States. Within the forest products industry alone there are hundreds of intake structures which provide water used at least in part for cooling purposes.

Most intake structures have been in existence for decades. These decades of experience have produced no evidence that there is widespread adverse impact to aquatic biota from these intake structures. Improperly designed intake structures, especially if located in an ecologically sensitive zone, may result in adverse environmental impact. EPA's goal should be to assure that the resources of the regulatory agencies and the regulated public are focused on the situations that present significant potential for causing adverse environmental impact and therefore warrant further investigation.

While the August 10, 2000 proposed rule addresses New Facilities, it must be evaluated in the context of the anticipated rule for Existing Facilities. The regulatory burden faced by U.S. industry, and the burden placed on state and federal regulatory authorities in overseeing and responding to the regulated community's efforts to comply with the 316(b) regulations, will be imposed by both the New Facility and Existing Facility rules. Thus, it is important for EPA to establish an appropriate threshold now for determining which cooling water intake structures will be subject to scrutiny under the Section 316(b) regulations; thereby reducing the adverse impact of the rule for the regulated community as well as the permitting and enforcement agencies.

AF&PA is not suggesting that the thresholds have to be or even should be the same -- there may be an argument for a higher threshold for Existing Facilities, for example, based on the fact that any impacts may have already been experienced and can be determined empirically to be insignificant. It is still important, however, for EPA to utilize more realistic de minimis thresholds for the New Facility rule.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold applicable to new facilities was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

Nor does EPA agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

The two MGD threshold applies to new facilities. Existing facilities will be regulated under the Phase II and III regulations.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.062.004

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

EPA has the authority and justification to set a threshold much higher than the <2MGD proposed and has an obligation to consider more reasonable regulatory approaches under the Small Business Regulatory Enforcement Fairness Act (SBREFA).

It is clear from EPA's own docket materials that EPA could choose an applicability threshold of much greater than 2 MGD and still capture the vast majority of cooling water. (See docket material DCN 1-1049-TC). Indeed, at a 10 MGD threshold, EPA would still capture well over 99% of the cooling water and well over 70% of all intakes. In fact, at an applicability threshold of 25 MGD, the regulation would still capture over 99% of the intake flow and over 60% of the intakes in all industries.

EPA certainly has the discretion to set thresholds for regulation and has done so in numerous rules including effluent guidelines. The threshold concept is further endorsed in the NDRC v. Train consent decree, 8 E.R.C. 2120 (D.D.C.1979). EPA's establishment of size cutoffs for the new source review program under the Clean Air Act, for example, was upheld by the U.S. Court of Appeals for the D.C. Circuit, which found that EPA has inherent authority to decide not to impose requirements of a statutory program where "the burdens of regulation yield trivial or no value." Alabama Power v. Costle, 636 F.2d 323,361 (1979).

When Congress enacted Section 316(b), it was responding to studies in the 1960s that suggested that some very large electric utility cooling water intake structures, situated in sensitive locations and removing billions of gallons a day, could have a significant effect on the local surface water aquatic populations. It would be inappropriate for EPA to expand that concern about a few huge intake structures and use it as the reason for imposing regulatory burdens on thousands of relatively small cooling water intake structures, especially since, so far as we are aware, there is no evidence that these smaller structures have had any significant effect on surface waters. An intake structure that is designed to withdraw 10 MGD or less is smaller than the vast majority of electric utility cooling water intake structures (and even many intake structures in the pulp and paper industry). An intake structure withdrawing up to 25 MGD is still just a fraction of the size of most electric utility intake structures. Indeed, data in the docket indicates that almost 85% of the utilities withdraw more than 25 MGD and almost 90% withdraw more than 10 MGD. <FN 1>

EPA also has a statutory obligation under SBREFA <FN 2> to consider ways to minimize the adverse impact of its regulations on small businesses. There are hundreds of small businesses with cooling water intake structures that would be swept into the 316(b) regulations if EPA does not set a reasonable threshold for regulation.

Complying with this additional regulatory program, both in terms of the studies required and in terms of complying with location, design, and operation standards, would be a significant burden for all facilities, but especially for small businesses. Additionally regulatory agencies would be diverted into assisting small businesses with complying with these unnecessary requirements as well.

Footnotes

1 EPA 316(b) docket, DCN 1-1049-TC.

2 See AF&PA's Appendix A for anticipated cost impacts to small businesses for New Facility rule.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under this threshold and would leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, only 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA has concluded that the compliance costs for this rule are economically practicable and achievable for the industries affected. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available.

For further discussion of these points, see Sections VI.A.3., and X.D. of the preamble to the final rule, and the Economic Analysis.

Comment ID 316bNFR.062.005

Subject Matter Code	7.42
Request for Comment: Higher Threshold for Smaller Withdrawal Percentages	

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

EPA's 2 MGD threshold is too low and too restrictive.

When considering the suggested alternative language in Section E. {see 316bNFR.062.007} below, it is important to recognize that the 2 MGD threshold EPA has proposed would not limit the burdens of the rule only to those intake structures for which some further evaluation may be warranted. To make matters worse, the potential additional requirement for exemption for the rule that EPA discussed in the preamble, which would bring back into the rule intakes smaller than 2 MGD that withdraw more than 1% of the mean annual flow, rendering the de minimis threshold even less useful, without any environmental justification.

EPA should not adopt the unrealistically low 2 MGD trigger level contained in the proposed rule. As discussed later in these comments, an intake structure with a capacity of between 10 and 25 MGD should be exempt if it withdraws less than 10% of the stream flow even at critical low flow (which is often 1% or less of average stream flow). At any stream flow, an intake of this size would be unlikely to present a threat to maintaining a healthy, productive aquatic community, which, as noted elsewhere in these comments, is the standard by which EPA should be evaluating adverse impact

Furthermore, EPA recognizes that a 2 MGD threshold still captures almost all of the cooling water flows subject to regulation --99.97 percent in EPA's judgment. 65 Fed. Reg. 49068. It should be obvious that, if exempting smaller sources has any legitimacy at all, as we (and apparently EPA) believe it does, a cutoff that removes only 0.03% of the intake water flows from the regulatory program is inadequate.

EPA's reference in the preamble to a study, which showed large numbers of estimated “fish” mortalities from impingement and entrainment of a proposed 4.2 MGD intake structure in New York, does not justify limiting the de minimis threshold to 2 MGD. As pointed out elsewhere in these comments and in comments being filed by the utility industry, because of the reproductive strategies of fish, mortality of thousands or even millions of juveniles and eggs it is not always sufficient to conclude that there is potential adverse environmental impact (AEI) on the indigenous fish population.

Indeed, the significance of the findings in the New York State study <FN 3> has already been brought into question. In the document titled "Ruling on Proposed Issues for Adjudication and Petitions for Party Status" for the case which was the subject of the New York Study (the Athens case), the presiding judge noted that there were a number of reasons to suspect that the impacts on fish populations were overestimated by the study. The judge indicated that:

"[a]lthough the mortality studies assume a constant water withdrawal rate of 7.5 mgd, which is the plant's maximum withdrawal rate, no one contests that the proposed plant would usually withdraw 4.2 mgd on average, or 44% less than the maximum. In addition, the proposed facility would withdraw the maximum capacity only a small percentage of the time. The parties do not dispute there would be fewer than average numbers of eggs in the water column at the depth where the cooling water intake

structure would be located even though the model assumes an even distribution. Furthermore, without attempting to quantify the phenomenon, or assign it any specified weight, 'compensation' is another reason why the calculated mortality rates should be considered conservative. The parties do not assert that compensation does not exist. Finally, the estimated rate of mortality would also tend to be high because the maximum size fish assumed to be killed (20 mm) is actually large enough for many species to escape the cooling water intake structures by swimming away." <FN 4>

Given that (a) the projected mortalities were associated with a modeled intake flow of 7.5 mgd, and (b) the impacts are likely to have been overestimated by the modeling exercise, the study would seem to provide little support for an applicability threshold as low as 2 MGD. <FN 5>

Most significantly, according to Table I of the Athens case study. the estimated number of reductions in fish for every species reported (for "average" case and "worst" case scenarios) were substantially less than 1 %.

Footnotes

3 EPA 316(b) docket, DCN-1-1039- TC: State of New York Department of Environmental Conservation; DEC No. 4-1922-00055/0001; SPDES No.: NY-0261009; Interim Decision.

4 EPA 316(b) docket DCN 1-1039-TC: State of New York Department of Environmental Conservation; DEC No. 4-1922-00055/0001; SPDES No.: NY-0261009; Interim Decision.

5 EPA 316(b) docket DCN 1-1039-TC: State of New York Department of Environmental Conservation; DEC No. 4-1922-00055/0001; SPDES No.: NY-0261009; Interim Decision.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under this threshold and would leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, only 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

No percentage flow threshold has been added to the applicability provisions. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities as one of several requirements. For further discussion of these points, see Section VI.A.3, VI.C, and VI.D of the preamble to the final rule.

Comment ID 316bNFR.062.006

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

EPA's threshold should not be limited to one percent of annual stream flow,

EPA offers no justification for its contemplated additional requirement that the intake not remove more than one percent of the annual stream flow. There is no reason whatsoever to conclude that withdrawing one percent of the stream flow would adversely affect the aquatic population, even if one assumes that all of the organisms in that water would be unable to escape the intake and that none of those impinged or entrained would survive (both of which are demonstrably false assumptions).

If EPA adopts an appropriate definition of Adverse Environmental Impact, focussing on effects on the indigenous population rather than effects on individual organisms, it should be clear that a one percent threshold is unnecessary, and overly conservative.

EPA Response

No percentage flow threshold has been added to the applicability provisions of the final rule. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities. The requirement for freshwater rivers and streams is design intake flow no greater than 5 percent (not the 1 percent suggested) of the source water annual mean flow. EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including, but not limited to, assessments of fish and aquatic organism population impacts.

Comment ID 316bNFR.062.007

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 125.81

Who is Potentially Subject to New Facility Rule

We believe the following language should be included in the New Source cooling water intake structure regulation and a threshold at least as high should be included in the future Existing Source Rule.

This language would help minimize the regulatory burden on businesses, including small businesses and on regulatory agencies, while focusing attention on those intake structures that are reasonably likely to warrant evaluation to determine whether they may be causing adverse environmental impact. Operators of small intake structures will need to know the design capacity of the intake structure and some others will also have to determine the 7Q10 for the surface water from which they are withdrawing cooling water. These simple steps will allow the many facilities that should be exempt from the regulation(s) to easily determine that they are not covered by the rule.

Accordingly, AF&PA recommends that EPA substitute the following language for the third clause to proposed 40 C.F.R. § 125.81:

This subpart does not apply to a new facility that proposes to use a cooling water intake structure with a design intake flow:
1. less than or equal to 10 million gallons per day; or
2. greater than 10 million gallons per day but less than or equal to 25 million gallons per day, provided that such flow does not exceed:
   a. 10 percent of the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically (7Q10) of the source water, for a non-tidal river, or
   b. 10 percent of the mean annual volume of a lake or reservoir, or
   c. 10 percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level, for a tidal river or estuary

For New Facilities, because there is no actual flow experience and the design flow is readily available, we agree with EPA's proposal to apply the threshold to intake design flow.

EPA Response

See response to 316bNFR.035.009.

Comment ID 316bNFR.062.008

Subject Matter Code EXIST

Existing Facility Rule

Author Name Theresa Pugh

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When EPA develops a threshold for the Existing Facility Rule, reliance on design flow would be inappropriate, for several reasons. For one, design flow may not be ascertainable for older facilities, and the facility may actually be withdrawing more water than the original intake structure design flow. Most importantly, design flow will often substantially overstate the true impact that the intake structure has on the source water.

Many facilities have actual intake flows far below the intake structure design flow, either because the intake structure was "over-designed" or because the facility has substantially reduced its water usage over time. Treating such an intake structure as if it really were withdrawing at a much higher rate and therefore as if it has greater potential to affect the source water would be unrealistic. It also would remove an incentive for further water usage reductions: if a facility is "stuck" with its intake structure design flow regardless of how much it reduces its cooling water needs, there is no incentive, in terms of application of Section 316(b), for the facility to reduce its water usage.

Thus, in the Existing Facility rule, EPA should substitute “actual intake flow” for “design intake flow” in the proposed regulatory language above and should include a definition of that term. We suggest that “actual intake flow” be defined as “the highest 30-day average intake flow during the last 5 years.” This is a number that should be easy for facilities to determine, and it would assure that any peak withdrawal periods are not being masked by a longer averaging period.

EPA Response

Today's rule applies only to new facilities and EPA will address existing facilities in Phase II of this rulemaking.

Comment ID 316bNFR.062.009

Subject Matter Code	7.42
Request for Comment: Higher Threshold for Smaller Withdrawal Percentages	

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By adopting AF&PA's suggested thresholds, EPA will have addressed the vast majority of potential entities and be left with a very manageable number of situations that can be dealt with on a site-by-site basis as needed. Should EPA fail to adopt the AF&PA proposal, the costs impacts associated with the retrofitting of Existing Facility with CWIS controls at Existing Facilities would be far more expensive with no commensurate benefits.

New Facilities would likely face some space constraints given the cost and availability of real estate when constructing new intakes. The need for placement of a New Facility near major business markets, and limited profit margins within the forest products industry are among the other complicating factors that might preclude New Facilities under this rule. (See Section VI of these comments).

As shown above, EPA believes that a 25 MGD cutoff would still leave more than 99% of cooling water flows subject to regulation. <FN 6> Using this threshold value would certainly limit the rule to intake structures that should warrant further evaluation, while dramatically simplifying implementation of the rule and minimizing its impact on small businesses. But the percentage of cooling water flows subject to regulation would even be higher with the restriction AF&PA proposed above -- that intake structures between 10 and 25 MGD not remove more than 10% of the 7Q10 <FN 7> stream flow.

Footnotes

6 EPA 316(b) docket, DCN 1-1049-TC.

7 The lowest average seven consecutive day flow with an average recurrence frequency of once in 10 years determined hydrolgically.

EPA Response

This rule applies to new facilities. Existing facilities will be addressed in Phase II and III regulations.

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25

MGD would cover 94.9 percent of the total flow, but many facilities who could technically achieve and economically afford the requirements of the rule would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards

No percentage flow threshold has been added to the applicability provisions of the final rule. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities. For further discussion of these points, see Sections VI.A.3, VI.C, and VI.D of the preamble to the final rule.

For existing pulp and paper mills, a 25 MGD cutoff would still result in approximately 85% of the mills and intake flow being subject to regulation. <FN 8> This does not mean, though, that larger mill intake structures present a significant risk of adverse environmental impact. We believe that the vast majority of those mills would be able to demonstrate no Adverse Environmental Impact.

NCASI <FN 9> , the forest products industry's environmental research organization, has twice assembled available pulp and paper mill receiving water studies and has published reports summarizing the findings of those studies. The first of these reports <FN 10> (NCASI Technical Bulletin No. 573), "Pulping Effluents in the Aquatic Environment -- Part II: A review of Unpublished Studies of In-Stream Aquatic Biota in the Vicinity of Pulp Mill Discharges," was published in 1989. It included 40 case histories where monitoring had been carried out in mill receiving waters above and below the point of effluent discharge.

The second report (NCASI Technical Bulletin No. 757), “A Synopsis of Recent Studies on the Impacts of Pulping Effluents in the Aquatic Environment,” was published in 1998. The more recent report included 26 case histories, including an update on studies that had continued over the period since the previous bulletin, as well as new studies that had been initiated since the earlier study. The case histories involved a variety of aquatic ecosystem health assessment approaches but most included one or more periphyton, macroinvertebrate, or fish population monitoring components.

Although these studies were designed to assess potential impacts from mill effluents, there were many cases where intake structures were also located within the study areas. NCASI has examined these studies retrospectively to determine whether they provide useful information on potential impacts of mill intake structures on fish populations. Underlying this retrospective examination was the premise that, in cases where impacts were observed, the character of the impacts might suggest whether they were due to the intake structure and, in cases were there were no significant impacts to fish abundance or diversity, it could be concluded that the intake structure was not causing adverse environmental impact.

For the purpose of addressing the potential effects of mill water intakes on fish populations, NCASI screened the case histories presented in the two technical bulletins to identify those that included fish population monitoring. This number was further reduced by additional screening for locations where effluent was discharged to lakes, dam impounded waters, or marine or estuarine waters where upstream/downstream movement of fish would be limited and consequently interfere with the ability to determine the potential effects of a water intake. Also excluded were mills that obtained water from wells or from other sources, or where the water intake was located on a stream or channel spatially removed from the main river.

NCASI determined that a total of nine case studies appeared to be good candidates for evaluating the combined effects from mill effluent and water intake structures. Table I provides a brief summary of the findings from the fish monitoring data and, for each case history, indicates where in the Technical

Bulletins EPA can obtain additional information.

Fish monitoring data did not indicate adverse impacts in seven of the nine cases where it was possible to retrospectively examine the potential impacts of intake structures. For these seven cases, withdrawal rates ranged from 10 to 34 million gallons per day and 2.3 to 11.9 % of river 7Q10 low flow, respectively. There were downstream differences indicated for the remaining two case histories.

One of the two cases where upstream/downstream differences were identified, the Pigeon Rivers, represented very high effluent concentrations. In this case, the differences in fish populations may have been due to enrichment effects since higher levels of algal growth and benthic invertebrate biomass were also noted downstream.

For the remaining case, the Leaf Rivers, downstream fish populations were reported to be in lower abundance but not significantly different in community structure than upstream locations. The contractor reports for this study indicate that fish number differences may have been due to natural habitat differences upstream and downstream of the mill. Additionally, fish number differences varied with the type of gear used for collection and for type of fish. There were no upstream/downstream differences, for example, for minnows (Cyprinidae) which comprised over 90 percent of the fish collected.

Although these nine studies weren't designed to address water intake effects on fish populations, the absence of effects on fish abundance and diversity at the large majority of these locations provides important evidence that mill intake structures are not causing widespread impacts to fish populations. The studies also indicate that the applicability threshold for the 316(b) rules could be significantly higher than 2 MGD and still be environmentally protective over a range of conditions representative of industry practice.

{Table 1 appears in orginal form on copy; please see Attachments}

Additionally AF&PA is aware of a review conducted by the American Petroleum Institute <FN 11> of the 1998 and 1996 EPA National Water Quality Inventory reports <FN 12> to determine if any states had specifically identified entrainment and impingement as sources or stressors leading to impaired aquatic life uses. None of the states identified entrainment and impingement of aquatic life by cooling water intakes as a source or cause of impairment in rivers/streams, lakes, estuaries, or oceans. AF&PA agrees with API that the absence of such designations (which could be listed under either the hydrographic modification or type of impairment category) supports the conclusion that significant adverse environmental impacts due to cooling water intakes are rare and highly site-specific.

The extremely conservative nature of the rule implies that there is a severe national problem from the impingement and entrainment of aquatic organisms by cooling water intake structures. However, EPA fails to support this case with a national assessment of the extent and nature of the problem. In its preamble, EPA does note some potential problems at a few, high-profile sites. For these specific facilities, however, EPA notes outdated information and furthermore fails to note that impacts remain technically debatable.

After 25 years of research on the impacts of cooling water intake structures, EPRI <FN 13> has

failed to identify a single site where definitive or conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures. We do, however, recognize that at a few sites, potential impacts remain unresolved and require further investigation. We also recognize the potential for cumulative impacts from cooling water intake structure operation; however, there is no obvious evidence that cumulative impacts are of major concern and warrant overly conservative national performance standards to prevent them.

In summary, AF&PA's suggested approach would still be protective of aquatic populations based upon what is known -- especially with the overly cautious additional hurdle of meeting the 10% of 7Q10 requirement for intakes >10 and <25MGD.

Footnotes

8 EPA 316(b) docket, DCN 1-1049-TC

9 National Council of the Paper Industry for Air and Stream Improvement, Inc.

10 See Appendix B of AF&PA comments

11 Conducted by Lial Tischler, Tischler & Kocurek, contractor to API.

12 EPA National Water Quality Inventory Report summary, EPA 8415-00-001; EPA 841-R97-008)

13 EPRI-formerly known as Electric Power Research Institute

EPA Response

To the extent that this comment is directed at the existing facility rules, EPA is not addressing existing facilities in this rule. With regard to the question of regulatory thresholds, see preamble to today's rule, specifically section I, for a discussion on the scope and applicability of today's rule.

Comment ID 316bNFR.062.011

Subject Matter Code 7.1

Definition: New Facility

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The circumstances of a New Facility and an Existing Facility are substantially different.

AF&PA generally agrees with the approach taken regarding the types of facilities to which the proposed rule would apply (rule preamble 65 Fed. Reg. 49066). It is appropriate to limit application of the section 316(b) new source standards to "greenfield" and "stand-alone" facilities. Id. However, EPA needs to further clarify the language in the definition used with the rule. The Agency should incorporate the language on page 49066 that explains that the rules apply to "greenfield" and "stand-alone" facilities and clearly describes what those are.

The proposed requirements for new facilities are based on the assumption that the developer/owner of the New Facility has more flexibility when choosing the location of the facility and cooling water intake structure and to design the plant's processes and utilities in a way that will allow it to minimize cooling water usage. Those circumstances obviously do not apply to Existing Facilities. As EPA recognized at 65 Fed. Reg. 49064, there are numerous ways in which Existing Facilities will be limited in their ability to comply with specifications for intake structure location, design, and operation. Existing Facilities would also incur significantly higher costs, if required to retrofit the same technology required of New Facilities. Thus, it is critical that EPA make clear distinctions between the intake structures that will be subject to the proposed New Facility requirements and those that will be covered by the subsequent Existing Facility requirements.

In summary, EPA must clearly define the applicability of the proposed rule, so that it is obvious that these new restrictions only cover a "greenfield" plant or a new, substantially independent plant co-located with an existing plant and requiring a new or expanded intake structure.

EPA should state that, in determining whether a new, separate facility constructed at the site of an Existing Facility is "substantially independent," the permitting authority should evaluate whether it would be practicable for the facility owner to construct and operate the new operation at a different location. If, because of the nature of the interconnection between the existing operations and the new ones, it would not be practicable to locate the new operations somewhere else, then the proposed new source standards should not apply. These new, but not separate operations should be treated as a modification of the existing plant. This interpretation is consistent with EPA's desire for encouraging development at "brownfield" sites rather than "greenfield" sites.

EPA Response

This rule applies to new facilities. Existing facilities will be addressed under future rulemakings (i.e., Phase II and Phase III).

See response to 316bNFR.030.003.

With regard to defining when a facility is substantially independent under 40 CFR 122.29, EPA does not believe it is feasible to project under what circumstances owners and operators are free to select any location they desire for a new facility. For this reason, EPA takes the facility as it is planned for purposes of determining whether it is a new facility. In the final rule EPA does not believe it is appropriate to define the phrase “substantially independent” as used in 122.29(b)(1)(iii) as facilities that could be practicably located at a separate site. Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether ... processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." EPA does not think it is feasible for the permit authority to judge whether the facility could have been elsewhere for the purpose of determining whether the facility is subject to the new facility rules.

Comment ID 316bNFR.062.012

Subject Matter Code 7.1

Definition: New Facility

Author Name Theresa Pugh

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EPA should incorporate the preamble language on page 49066, explaining what a "modified" intake structure is, into the rule itself. Otherwise, work to maintain a structure, rather than to increase its capacity, might incorrectly be viewed as creating a "modified cooling water intake structure."

EPA should delete the reference to 40 CFR § 122.2 in the definition of "new facility" in proposed section 125.83 because it is unnecessary and confusing. The definition of "new discharger" in section 122.2 is broader than "new discharger" in section 122.29(b)(2). The former does not clearly incorporate the "substantially independent" test. Even more importantly, under section 122.2 an existing indirect discharger that commences discharging directly to "waters of the United States" becomes a "new discharger" under 40 CFR § 122.2. It would be inconsistent with the rationale for the 316(b) New Facility standards to apply them to an indirect discharger converting to a direct discharger, since the company under those circumstances does not have the flexibility in designing the location, configuration, and withdrawal rate for the intake structure that it would if it were constructing a new manufacturing process at a new location.

EPA Response

See response to 316bNFR.030.003.

An existing indirect discharger that commences discharging directly is potentially subject to this rule only if it meets all relevant applicability criteria. For example, facilities that are new sources or new dischargers would need to have a new cooling water intake structure or, as EPA has clarified in the final rule, have to make changes to an intake structure that result in an increase in design capacity. In both cases, the facility would have the opportunity to address rule requirements. Simply changing from an indirect to a direct discharger would not result a facility being subject to this rule.

Comment ID 316bNFR.062.013

Subject Matter Code MISC

Miscellaneous Comment

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The Section 316(b) proposed rule for New Facilities could have serious and unintended consequences for the forest products industry, blocking important cogeneration projects.

The forest products industry is the nation's largest producer and user of cogenerated energy. Most cogenerated energy is produced at its own mills.<FN 14> The industry expects that cogeneration plants will continue to be an essential source of energy for this industry.

EPA needs to include special provisions dealing with cogeneration units. A cogeneration unit is energy efficient because the thermal energy used to produce electricity is also used for other processes. In the forest products industry, this involves burning fossil-fuel, or wood fuel, in a boiler or using a combined-cycle gas turbine, to produce steam used to drive a turbine generator and then subsequently used for process steam to dry paper, lumber or satisfy other requirements at an industrial facility. There may be numerous interconnections between the cogeneration unit and the industrial facility which it serves. Boiler feedwater may be supplied by the industrial plant, and condensed steam from the industrial process is often returned to the cogeneration unit for reuse in the boiler. Boiler or turbine cooling water or cooling water used to condense steam may be then used as process water by the industrial facility. The cogeneration unit may be owned by the industrial facility or, alternatively, may be owned by a third party that enters into a contractual agreement with the facility (which may also include the leasing of the property for the cogeneration unit).

Another key point is that this cogenerated energy is mostly produced in the forest products industry from biobased fuels.<FN 15> These fuels are the largest fuel category used in the industry, and they are generally regarded as environmentally preferable since they are carbon neutral in terms of greenhouse gas and provide virtually no sulfur to the atmosphere. The combination of the use of this environmentally preferably fuel and the highly energy efficient cogeneration practice makes the energy processes within the forest products industry very environmentally attractive. AF&PA believes the EPA desires and encourages this type of industrial energy.

Congress and the Administration have shown a strong interest in encouraging cogeneration, and that interest is also reflected in EPA regulations, such as NSPS for electric utility steam generating units in 40 C.F.R. Part 60 Subpart Da and rules for the acid rain program in 40 C.F.R. Part 72. Similarly, EPA must assure that Section 316(b) regulations for new sources do not have the unintended effect of precluding or seriously disadvantaging new cogeneration units at Existing Facilities.

Since a cogeneration unit must be located close to an industrial facility, Section 316(b) requirements for the location of new cooling water intake structures and limiting them to a certain percentage of stream flow, for example, could effectively prevent the use of cogeneration at a particular existing industrial or agricultural facility. Meeting a required minimum cooling water recirculation rate may be impossible or at least undesirable for a cogeneration unit, where cooling water from the cogeneration unit may subsequently be reused as process water by the industrial facility (for improved energy efficiency) and then treated and discharged.

EPA must specifically recognize that a cogeneration plant can not be considered substantially independent from the industrial facility for which it provides thermal energy. Therefore, it should not be considered a "new facility" unless it was constructed at a totally separate greenfield site.

Because a cogeneration unit may be considered to be engaged in a different type of activity (electricity generation) than the associated industrial facility, the cogeneration unit might be considered a "new source" under 40 CFR § 122.29(b)(1).

EPA needs to build sufficient flexibility into the new source standards to accommodate the special issues that cogeneration units present, as described above. The rigid requirements of proposed 40 CFR § 125.84 would stifle the development of cogeneration at existing industrial facilities, frustrating Congressional and Administration policy of encouraging cogeneration.

At a time when the U.S. is concerned with both higher energy costs and electricity problems in some regions of the country that have resulted in brownouts and blackouts or grid failure, it is critical that the EPA not inadvertently do anything to discourage cogeneration. It is also critical that the forest products industry continue to contribute its surplus electricity to other power users without any fears that the New Facility regulations for 316(b) could diminish the economic viability of the new project.

Footnotes

14 Energy Information Administration (DOE), "Manufacturing Consumption of Energy 1994", DOE/EIA-0512 (94), December 1997.

15 Fuels from plant matter such as trees, grasses, agricultural crops and other material derived from living matter. Source: DOE, Biopower Website; www/eren.doe.gov/biopower/basics/index.htm

EPA Response

Please see response to comment 316bNFR.012.013 and 316bNFR.030.003.

Comment ID 316bNFR.062.014

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Theresa Pugh

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EPA correctly limits the rule to surface waters.

AF&PA strongly supports EPA's limitation of Section 316(b) requirement to cooling water withdrawals from surface waters, and we believe the Clean Water Act compels such a limitation. Section 31(b) directs EPA to develop requirements as part of "standards" established pursuant to Section 301 or 316 of the Act, "and applicable to a point source." This certainly evidences a focus on effects on surface water, and not on water use in general. (In fact, that focus applies to the entire Clean Water Act as indicated by the "reservation" clause in Section 510, which has been interpreted as clarifying that issues of water use, as opposed to water quality, are the sole province of the states.) Note also that the reference in Section 316(b) to Clean Water Act section 306 must be read to relate to point sources subject to New Source Performance Standards, not to indirect dischargers subject to pretreatment standards, because Section 306 did not include pretreatment standards at the time Section 316(b) was enacted. Thus, there would be no basis for EPA applying Section 316(b) requirements to indirect dischargers.

In addition, of course, Section 3l6(b) concerns "cooling water intake structures," not withdrawal or use of cooling water per se. While the term "intake structure" is not defined in the statute, both the dictionary meaning of "intake structure" and the environmental concerns that Congress was attempting to address dictate that the rule must be limited to surface water withdrawals. That approach is also consistent with how EPA historically has interpreted Section 3l6(b).

EPA Response

No response necessary.

Comment ID 316bNFR.062.015

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Theresa Pugh

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The proposed rule should not define cooling ponds as waters of the U.S.

AF&PA does not agree with EPA's statement that the rule would apply to structures that withdraw cooling water from cooling ponds. First of all, industry does not agree with, and has never conceded, EPA's assertion that Clean Water Act jurisdiction extends to cooling ponds and other isolated bodies of water used for industrial purposes. The language of proposed 40 C.F.R. §125.83, defining “cooling water intake structure” to be a structure used to withdraw water from “waters of the U.S.” is appropriate; EPA’s preamble statements that this means the rule applies to intake structures in cooling ponds is not correct.

Even aside from this dispute over the extent of the statutory jurisdiction, EPA's statements about application of the rule to intake structures in cooling ponds are contrary to EPA regulations and past practice. EPA regulations define "waters of the United States" to exclude "waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA...." 40 C.F.R. § 122.2. (Additional language limiting this exclusion to manmade bodies of water not created in waters of the United States was suspended in 1980 and never reinstated). Clearly a pond used to cool heated water falls within this exclusion.

The definition contains one exception to the exclusion, for "cooling ponds as defined in 40 C.F .R. §423.11(m) which also meet the criteria" for waters of the United States. That provision does not justify EPA statements in the preamble to the proposed new source 316(b) standards, however, for two reasons: First, 40 C.F.R. § 423.11(m) no longer exists. At a minimum, this "current ambiguity regarding the applicability of the waste treatment system exclusion to steam electric cooling ponds " gives permitting authorities the discretion, in EPA's view, to treat cooling ponds the same as other waste treatment ponds and exclude them from "waters of the United States." December 13, 1993 memorandum from Robert Perciasepe to W. Ray Cunningham, concerning proposed for the Florida Power Corporation cooling pond in Polk County, Florida. Second, even at the time this cooling pond exception was promulgated in 1980, it would not have applied to many of the cooling ponds covered by this proposed rule, because 40 C.F.R. § 423.11(m) related exclusively to cooling ponds used by steam electric generating plants. EPA's simplistic statements in the preamble to the proposed rule, that because the rule applies to withdrawal of water from "waters of the United States" it necessarily applies to intake structures in cooling ponds, fails to recognize this regulatory background, and EPA therefore should disavow those unqualified statements in the preamble to the final rule.

Moreover, EPA should affirmatively exclude intake structures located in cooling ponds, to the extent that those cooling ponds may be determined to be "waters of the United States." The concerns that Congress was attempting to address in enacting Section 316(b) related to depletion of fisheries and interference with productive aquatic communities in public waters, not activities in private cooling ponds.

EPA certainly has the discretion to interpret Section 316(b) not to apply to such intake structures;

alternatively, EPA could simply make a blanket determination that any entrainment or impingement of aquatic organisms that happen to be present in cooling ponds does not result in Adverse Environmental Impact, since it does not have the potential to affect balanced, indigenous populations in public water ways.

EPA Response

As suggested by the commenter, EPA has addressed the status of cooling ponds in the preamble to the final rule. See also Response to Comment 316b.NFR.068.151.

Comment ID 316bNFR.062.016

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Theresa Pugh

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EPA's definition of "cooling water" must be modified to reflect the forest products industry's reuse of the same water to perform both process and cooling functions.

Introduction

EPA's jurisdiction under Section 316(b) is limited to cooling water intake structures and the EPA has correctly acknowledged that for some facilities, one intake is used to bring in both process and cooling water. EPA's only attempt to address this critical issue, however, was by defining "cooling water intake structure" as including only structures withdrawing a combined intake that is at least 25% is cooling water. While we appreciate EPA's acknowledgment of the distinction between process and cooling water, the Agency needs to be much clearer in excluding process waters that must be heated from the rule. AF&PA also believes the 25% cutoff is too low.

Many pulp and paper mills reuse the same water many times to provide both process and cooling functions. These waters are often commingled within mill water distribution systems such that water used first for cooling later becomes process water for some manufacturing steps. This water reuse practice has many obvious environmental benefits. To acknowledge that such "cooling waters" are being recycled and used for process purposes. EPA should exclude them from the definition of cooling water.

Examples from the forest products industry <FN 16>

We can offer a number of examples of the water reuse practices described above. In the following descriptions, we do not identify the company names or locations although we can do so if it would assist EPA in examining cooling water reuse practices in the industry. All four examples are available to EPA in the flow diagrams included with industry responses to its Detailed Questionnaire.

Mill A is fairly typical in that it recovers "waste" heat by first using water for "cooling" and then using the heated water in the manufacturing process. In this case, much of the mill's raw water is first run through one of several pieces of equipment in which it serves as cooling water. These include a steam turbine condenser, heat exchangers in the paper machine areas (most likely recovering heat from dryer exhaust), a room air conditioning unit, a turpentine condenser (producing a co-product useful as a fuel or chemical feedstock), and non-contact condensers in the evaporator/recovery area (providing a driving force for evaporation to generate concentrated black liquor, one of the biobased fuels referenced above, which is burned for its energy content and to recover pulping chemicals).

The heated "cooling" water is directed to one of a number of hot or warm water tanks in the mill where it is used according to the heated water requirements of the mill's individual process areas. Although much of the mill's process water performs a cooling function as it passes through the mill, this cooling actually performs an energy conservation function and the water ultimately becomes part of the mill's overall process water system. Without this water reuse and heat recovery practice,

additional fossil fuels would have to be burned to provide the needed warm/hot water .

At Mill B, all incoming water might be said to perform a "cooling" function as it passes through the mill's steam turbine condenser. Subsequently, the heat transferred to the water is used in the mill (except during summer months when a portion of the water is run through a cooling tower to prevent incoming water from becoming too hot for some needs). Some of the water performs a secondary "cooling" function in the recovery area evaporators and surface condensers before finally being used as process water in the paper mill, pulp mill, and recausticizing area. By using this water first for "cooling" and then for process functions, the mill conserves both water and energy.

Mill C is using an interesting combination of systems to capture energy from "cooling water." Slightly over two-thirds of the water coming into the mill first passes through either the steam turbine condenser or the non-contact condenser on the black liquor evaporators. After going through the condensers, this water is passed through a cooling tower. Somewhat less than 25% of the cooled water is discharged through a non-contact cooling water outfall and the remainder is mixed with river water to provide the mill with incoming water having the desired temperature. All told, over 60% of the water going to the mill's process water storage tank first performs a "cooling" function to recover heat needed by the mill. <FN 17>

The mill also has several dedicated cooling water recirculation systems on turbine condensers and condensers in the recovery area. It is not unusual for mills to have a combination of cooling water systems, some of which are integrated with the mill process water system, and others of which are segregated from process water. The combination selected by a mill reflects the energy needs of the mill, the capacity of the mill's wastewater treatment system, intake or discharge constraints, and a variety of site-specific factors.

Mill D's approach to water use involves the intentional segregation of much of the mill's cooling water from the process water system. This allows much of the water to be discharged through a non-contact cooling water outfall and minimizes the amounts that have to pass through the mill's wastewater treatment system. This approach is not uncommon in the industry. Even at this mill, however, of the 11.8 MGD coming in through the separate process water intake structure, over 90% first performs a "cooling function" by passing through the surface condenser on the black liquor concentration system where it picks up significant heat needed by the mill. If this were not done, additional fuel would be required to heat the water to the temperature needed by the mill. The significance of this fact is described, on an industry basis, in section II. G. of these comments.

Environmental benefits of water reuse

In contrast, as demonstrated in the examples, at most mills, much of the energy removed by cooling is subsequently used in the mill, making the operations more energy efficient. Indeed, in essentially all cases where cooling water is subsequently used in the process, the primary objectives are energy and water conservation. In addition to saving energy, however, this reduces emissions by reducing the amounts of fuel required to run the mill. In these situations, the segregation and recirculation of cooling water would not result in reduced water intake because process water withdrawals would have to increase to satisfy the demand previously met by cooling water. Further, withdrawals would also have to increase to supply make-up to the cooling water recirculation system.

Many mills have made (or are in the process of making) additional changes to further conserve the water usage, and a diversion of capital into another requirement will only delay process water reductions that would result in yet additional reduced water intake volume by the industry. Moreover, treating process water which also performs a cooling function as "cooling water" for purposes of applicability of Section 316(b) standards will in some cases compel facilities to cease this practice, with substantial adverse environmental and energy consequences. It would simply not be possible, for example, for an industrial facility to recirculate its process water comparable to a "closed-cycle recirculating cooling water system," nor may it be possible to reduce process water use to achieve the intake flow requirements of the proposed rule. Industrial facilities would be forced to separate their cooling water from their process water to meet these standards for cooling water intake structures, with the result that they would lose the environmental benefit of recovering waste heat for process purposes.

This would result in the increased burning of fuel (coal and other fuels) to make up for the additional lost heat which would, in turn, create other adverse environmental impacts such as higher particulate matter (PM), sulfur dioxide (SO2), nitrogen oxides (NOx) and carbon dioxide (CO2), a greenhouse gas, in particular. These unintended consequences to the environment are negative and should be avoided.

Data in the docket <FN 18> indicate that EPA has identified 66 pulp and paper mills using a total of approximately 2 billion gallons of cooling water a day. Using copies of EPA's Detailed Questionnaire that it received from its members, NCASI estimates that it is not unreasonable to assume that approximately one-third of the industry's cooling water is subsequently used in the process. If this one-third, amounting to 650 million gallons per day, is heated by only ten degrees Fahrenheit as it performs its cooling function (a conservative assumption), the fuel savings for these 66 mills is estimated to be over 20 trillion Btu/year.

If fossil fuels, instead of cooling water, were used to provide this energy, the increased emissions from these 66 mills of CO2, a greenhouse gas, would be in the range of 1.5 to 2.5 million tons per year, depending on the type of fossil fuel used. Significant amounts of additional PM, NOx , SO2 and other pollutants would be emitted as well. The increases in emissions for the overall industry could be expected to be significantly larger.

These emissions (PM, SO2, NOx and CO2.) would be the direct result of applying the proposal New Facility rules to existing pulp and paper mills. Most importantly, the total water withdrawn from surface waters would not change significantly, since the same amount of water would still be needed for process purposes. Indeed, withdrawals might even increase because the mill would not only require process water but also quantities adequate to make up for the losses and blow down in the segregated and "closed" cooling water system.

Suppose, for example, an industrial facility will need 50 MGD of process water and will also need 20 MGD of cooling water. If it used a once-through cooling system, its overall water needs would be 70 MGD. If it installed a closed-loop cooling water system, its water needs might be 52 MGD (assuming 10% evaporative loss and blowdown for the closed-loop cooling water system). If the facility can use heated water from a once-through cooling system for some of its process water needs, however,

overall water withdrawal could be reduced to as low as 50 MGD.

These examples are provided to help illustrate the fundamental difference between cooling water use practices at many pulp and paper mills and those at dedicated electric power generation facilities. Stand-alone power generators not involved in cogeneration practices, have no use for the heat in low-pressure steam and therefore release the energy to the environment via transfer to cooling water. At these power plants, the only function of the cooling water is to remove heat from the system. This situation rarely applies to the forest products industry sector.

Footnotes

16 Confidential Business Information (CBI) protected water reuse information was provided to the U.S. EPA on May 28, 2000. This is a non-CBI version of similar manufacturing operations and water reuse.

17 In this case, the 50% trigger level suggested below would not exclude this energy and water use efficient water intake system from the Section 316{b) rule. This demonstrates the need for specifically excluding waters reused for process purposes from the rule.

18 EPA 316(b) docket, DCN, 1-1049-TC

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

EPA chose twenty-five percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4)

percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.062.017

Subject Matter Code DELETE

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Author Name Theresa Pugh

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This comment was incorporated into 316bNFR.062.016.
Comment deleted. Text included in comment 316bNFR.062.016

EPA Response

No Response Necessary.

Comment ID 316bNFR.062.018

Author Name Theresa Pugh

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Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

An excessive cost burden would result from an interpretation of closed cycle cooling that does not recognize the reuse of cooling water at process water applications in manufacturing facilities. A literal interpretation of closed cycle cooling would preclude the discharge of this water, even if the water is reused in one or more process applications. Consequently, a manufacturing process requiring warm water, such as in the papermaking industry, would need to heat additional quantities of surface water for process applications rather than reuse warm cooling water. In short, this interpretation would result in the cooling of water at one location of the mill (i.e. cooling towers in closed cycle cooling systems) and the heating of essentially the same quantity of water at another location.

Using reasonable assumptions regarding conditions for heating process water (delta T= 10 °F, 85% boiler efficiency), the energy needed to heat the additional quantity of process water for these 66 mills would be approximately 20 to 25 x 10^6 MMBTU. At an energy cost of $3 to $4 per MMBTU, the annual cost to heat water needed to replace the warm water currently obtained from once- through cooling systems is on the order of $20 to $100 million dollars per year for these 66 mills.

Converted to a present value, this represents a cost of $300 million to $1.2 billion dollars. Clearly the cost for the entire pulp and paper industry to heat additional quantities of surface water to replace warm cooling water would be substantially higher.

Should the 316(b) regulations for Existing Facilities include a requirement to reduce intake flow to a level commensurate with a closed cycle recirculation cooling water system and if the definition of closed cycle cooling does not recognize the reuse of cooling water as process water, the cost to heat additional surface water for process applications will likely exceed, perhaps by a wide margin, the industry's cost to install technologies designed to reduce impingement and entrainment.

EPA Response

EPA agrees with the commenter that reuse of cooling water in process water applications at manufacturing facilities should not be precluded through this rule. See the preamble to the final rule and response to comment 316bNFR.062.016. In EPA's view, the final rule will not dissuade (and may encourage) the reuse of cooling water as process water (and vice versa). Therefore, the commenter's concern that manufacturing facilities would need to heat additional quantities of surface water has been addressed. The energy estimates provided by the commenter are persuasive, and EPA made the changes to the final rule (as explained in 316bNFR.062.016) as a consequence. Based on these changes, EPA expects no incremental energy impacts at manufacturing facilities as a result of the final rule.

Comment ID 316bNFR.062.019

Author Name Theresa Pugh

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Subject Matter Code 125.83.3

Definition: Closed-cycle

EPA may have been attempting to address some of the problems described above by defining "cooling water" in proposed 40 C.F.R. § 125.83 as water whose "intended use... is to absorb waste heat rejected from the process or processes used, or from auxiliary operations on the facility's premises." Arguably, the "intended use" of water withdrawn and used for pulp washing at a pulp and paper mill, for example, is pulp washing in the manufacture of paper, regardless of whether the water first is heated with waste heat or is heated in a boiler. Because of the considerable potential confusion on this issue, however, EPA needs to be clearer. AF&PA suggests the following be added to the proposed definition of "cooling water:"

“If heated water is needed for a manufacturing process, use of waste heat to heat that water does not make that process water “cooling water.”

Without this clarification to the definition or something like it, the 316(b) rules could have substantial adverse air quality and energy impacts, without producing any substantial reduction in the amount of water withdrawn by such industrial facilities.

EPA Response

See 316bNFR.012.012.

Comment ID 316bNFR.062.020

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Theresa Pugh

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EPA should increase the 25% trigger in the definition of cooling water intake structure to 50%.

EPA's proposal to use the 25% of water withdrawn used for cooling value limit in the rule for New Facilities would involve a somewhat different problem. The 25% threshold is EPA's attempt to recognize that not all intake structures are covered by Section 316(b), but only those intake structures that can be considered "cooling water intake structures." It would certainly be counterintuitive to call something a "cooling water intake structure" if more than three-quarters of the water that flows through the intake structure is not used for any cooling purpose at all.

By the same token, though, using any threshold less than 50% seems arbitrary; a "cooling water intake structure" logically is a structure whose primary use is to withdraw cooling water, not a structure whose primary use is to withdraw process water. Therefore, AF&PA urges EPA to amend the definition of "cooling water intake structure" by substituting “50” for “25.” AF&PA believes that this change not only is appropriate as a matter of statutory interpretation but also would not make a significant difference in the percentage of total cooling water flow that would be covered by the 316(b) program.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.062.021

Subject Matter Code 125.84.1

Compliance in Freshwater

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In proposed 40 CFR § 125. 84(g), EPA would require the permit writer to include in an NPDES permit for a New Facility "any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure...that are reasonably necessary to ensure attainment of water quality standards, including designated uses, criteria, and antidegredation requirements." There are several things wrong with this provision and it must be removed from the final rule.

First and most strikingly, this provision has nothing to do with implementation of section 316(b). That statutory provision only authorizes EPA to develop technology-based standards for cooling water intake structure location, design, construction, and capacity. That, of course, is what the other provisions of the proposed rules are intended to accomplish, but proposed section 125.84(g) addresses "more stringent requirements" that are not technology-based but are related to attainment of water quality standards.

EPA claims, at 65 Fed. Reg. 49091, that proposed section 125.84(g) is based not on Section 316(b) but on CWA Section 301(b)(1)(C). Although that subparagraph uses the words "any more stringent limitation," Section 301 clearly relates to effluent limitations, and that language cannot be reasonably read to authorize any other sort of limitation besides effluent limitations. Effluent limitations, of course, are restrictions on discharges from point sources, not restrictions on the design or location of cooling water intake structures. CWA § 502(11). Thus, it is not surprising that EPA never before, in almost 30 years of implementing the Clean Water Act, has suggested that Section 301(b)(1)(C) authorizes restrictions on cooling water intake structures. See, e.g., 40 C.F.R. § 122.44(d).

Congress recognized the potential for cooling water intake structures causing adverse environmental impact, and it addressed that potential adverse environmental impact through Section 316(b). EPA appears to be asserting that Congress, without explanation, provided overlapping authority to impose similar kinds of restrictions under Section 301(b)(1)(C). This makes no sense. Moreover, it is unclear what requirements could be "reasonably necessary to ensure attainment of water quality standards" beyond standards reflecting the "best technology available for minimizing adverse environmental impact." Finally, to the extent that proposed Section 125.84(g) is suggesting that limitations may be imposed in situations where water quality criteria are being attained, based on some ad hoc judgment of what is need to meet designated uses or to avoid degradation, there is no authority for that in the CWA or in EPA's regulations on water-quality-based effluent limitations.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II.

Track I specifies intake flow, velocity and source water-based flow requirements, as well as, where specified conditions exist, a requirement for the permit applicant to select and implement those design and construction technologies that are most effective in minimizing impingement mortality and entrainment of all life stages of fish and shellfish. Under this track, new facilities that withdraw greater than 2 MGD and less than 10 MGD are not subject to the intake flow requirements but must, in part, select and implement design and construction technologies that minimizing impingement mortality and entrainment of all life stages of fish and shellfish. Under Track II, the same design and construction requirements apply as under Track I, however, a new facility can use any technologies to demonstrate a level of performance comparable to Track I. Under both tracks, the rule provides that a facility is subject to requirements the Director deems necessary to comply with any provision of State law, including compliance with applicable State water quality standards.

Comment ID 316bNFR.062.022

Subject Matter Code 125.84.5

Director's Requirements

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In addition to specifying fairly detailed requirements for the location, design, and operation of cooling water intake structures at new facilities, EPA also included a provision in the proposed rules, 40 C.F.R. § 125.84(f), that would allow the permitting authority to include even more stringent requirements, on a site specific basis. Moreover, EPA asserts in the preamble to the proposed rule that even outfalls exempted from the proposed rule may be subjected to Best Professional Judgment (BPJ) 316(b) requirements imposed by the NPDES permitting authority. 65 Fed. Reg. 49067-68. There is no statutory basis for this assertion. and EPA should disavow it in the preamble to the final rule.

EPA's authority under Section 316(b) is limited to including requirements for cooling water intake structures in "standards" established pursuant to Clean Water Act Section 301 or 306. Section 316(b) does not explicitly authorize the imposition of requirements on individual cooling water intake structures, in advance of, more stringent than, or to sources not covered by nationally applicable standards, and there is no indication that Congress intended to do so.

Nor can EPA rely on the Clean Water Act provision that authorizes BPJ effluent limitations in NPDES permits. That provision, Section 402(a)(1)(B), when read in context, clearly is intended only to authorize limitations and monitoring requirements for "the discharge of any pollutant, or combination of pollutants" (emphasis added). Similarly, EPA regulations on BPJ permit limitations in 40 C.F.R. § 125.3 speak only of establishing "effluent limitations."

Moreover, even if Section 402(a)(1)(B) were not limited to requirements for discharges, it is limited to permits issued prior to the implementation of Clean Water Act Sections 301, 302, 306, 307, 308 and 403; it does not provide some sort of permanent authorization for imposing additional requirements in a permit regardless of whether applicable effluent limitations guidelines and standards have already been issued. (Note that EPA has asserted, although industry has not conceded this point, that in situations where standards have already been issued, more stringent requirements may be imposed on the basis of BPJ, but only if the requirements for a Fundamentally Different Factors Variances are satisfied. See 40 C.F.R. § 125.31(c); 40 C.F.R. § 125.3(c)(2) (authorizing BPJ limits "to the extent that EPA-promulgated effluent limitations are inapplicable").

EPA's suggestion that the permitting authority can go beyond the promulgated 316(b) standards on case-by-case basis, based on federal law, is thus unsupported by the Clean Water Act and at odds with EPA's own regulations.

Even if the Clean Water Act authorized EPA to include in its Section 316(b) rules provisions for case-by-case requirements more restrictive than the promulgated 316(b) standards, which it does not, EPA would still be overreaching with proposed 40 C.F.R § 125.84(f). That proposed subsection would authorize the permitting authority to impose more stringent requirements in an individual permit if they are determined to be "reasonably necessary to minimize the impingement and entrainment as a result of the effects of multiple cooling water intake structures in the same body of water, seasonal

variations in the aquatic environment affected by the cooling water intake structures controlled by the permit; or the presence of regionally important species." Section 316(b) cannot in any way be read to authorize permit conditions "reasonably necessary to minimize impingement and entrainment." As EPA has recognized previously, requiring the "best technology available for minimizing adverse environmental impact" does not necessarily require the minimization of impingement or entrainment. Nor is there, obviously, a "reasonably necessary" standard anywhere in the statute.

EPA Response

Section 125.84(f) has not been included in the final rule. Rather, the final rule uses a two-track framework that establishes technology-based performance requirements. Track I establishes clear technology-based performance requirements that promote fast-track permitting. Track II provides greater flexibility to demonstrate the same level of performance as required under Track I through the use of design and construction technologies (and other technologies) as appropriate on a site-specific basis. Under both tracks, the rule requires, as part of the 316(b) new facility requirements, the permit applicant to select and implement design and construction technologies to minimize impingement and entrainment if specified conditions exist (see, 125.84(b)(4) and (5); and 125.84(d)(3) and (4)). New facilities that withdraw between 2 and 10 MGD are required to implement design and construction technologies to minimize impingement and entrainment.

The new facility rule requirements apply according to the applicability provisions specified in 125.81. Under the final rule, new facilities that use one or more cooling water intake structures and are point sources subject to standards imposed under CWA section 301 or 306, but that do meet the applicability criteria for the national standards in this rule, are addressed on a case-by-case basis using BPJ. BPJ is appropriate because under 316(b) cooling water intake structure requirements are implemented through standards required pursuant to 301 and 306, and the final rule does address all facilities that meet the minimum 316(b) threshold.

Comment ID 316bNFR.062.023

Subject Matter Code	7.5
Applicability to Facilities Subject to NPDES Permit	

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AF&PA agrees with EPA that the proposed rule should apply only to facilities with point source discharges. Aside from the impracticability of trying to regulate facilities that do not discharge their cooling water or wastewater to surface waters, EPA lacks statutory authority to do so. Section 316(b) relates to standards “applicable to a point source” and references standards established under other sections of the Act (301 and 306) that related only to point sources at the time Section 316(b) was enacted. (Pretreatment standards for indirect dischargers were added to section 306 five years later.)

The fact that standards under Section 316(b) apply only to point sources, which in turn are required to have NPDES permits, does not, however, clearly require that Section 316(b) be implemented through NPDES permit conditions. AF&PA agrees with that approach, however, because it provides an established procedure for deriving requirements for individual dischargers and for administrative and judicial review of those requirements. The language EPA has proposed, however, is somewhat inconsistent in this regard and should be clarified.

EPA has proposed to amend Section 122.44(b), which sets forth conditions that must be included in state or federal NPDES permits, to reference 40 C.F.R. part 125, subpart I. EPA also has proposed new Section 125.80(a), which states that the requirements of that subpart must be implemented through NPDES permits. Various provisions of subpart I, however, are worded as if they apply independent of NPDES permit conditions. For example, the title of proposed Section 125.82 is "When Must I Comply with this Subpart?" and the title of proposed Section 125.84 is" As an Owner or Operator of a New Facility, What Must I Do To Comply with this Subpart?" Those provisions should instead be written in terms of what the permit must contain, what the permit writer should do, and what is required of the permit applicant. All the other subparts of part 125 are written that way, rather than stating what the discharger must do.

This is not just a matter of semantics. Facilities need clearly stated requirements, applicable to their particular circumstances, and any disputes about which requirements apply need to be resolved at the front end, rather than in an enforcement action based on allegations by a regulatory agency or a citizen suit plaintiff that the requirements of part 125 have not been met.

If EPA wants to implement Section 316(b) through the NPDES program (which, as noted above, we agree is a reasonable approach), then EPA also must make the language of the regulation consistent with that approach to implementation. making it clear that the facility must comply with the requirements contained in its NPDES permit. The proposed language of subpart I, which can be read as imposing obligations in addition to or inconsistent with the requirements of the facility's NPDES permit, must be eliminated.

EPA Response

Today's rule is written in a "plain English" format, which EPA acknowledges is different from the

format used in the remainder of part 125. However, the commenter does not identify any specific instances in which today's rule "can be read as imposing obligations in addition to or inconsistent with the requirements of the facility's NPDES permit…" Today's rule certainly would add requirements relating to intake of cooling water that will be implemented in the NPDES permits, which relate primarily to the discharge of wastewater. EPA has attempted to make new Part 125 Subpart I as clear as possible despite the difference in format.

Comment ID 316bNFR.062.024

Subject Matter Code	15.13
Discretionary/Voluntary Approaches	

Author Name Theresa Pugh

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EPA has no authority to require restoration measures. Section 316(b) does not provide this authority; it only authorizes EPA to require use of "technology" for "cooling water intake structures." However, AF&PA believes that the EPA and states should allow for voluntary restoration measures as a substitute for the specified BTA measures or requirements; where the voluntary measures are more efficient and result in equal or better aquatic protection. This type of flexibility would be consistent with the Administration's emphasis on more flexible, innovative approaches to environmental protection.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.062.025

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Theresa Pugh

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EPA's definition of AEI is too loose and will lead to open-ended determinations of AEI.

AF&PA is still trying to determine, based upon reading the proposed New Facility rule, if it is EPA's intent to protect 99% of the individuals in all populations of aquatic organisms (including zooplanton, benthic invertebrates, and fish) in "the area immediately around the intake." If this is EPA ' s intent, it presents numerous problems:

1. Different species warrant different levels of protection. There may be no need to protect nuisance species, for instance, while other species that are important in the food web or have special recreational or commercial value might warrant special protection. Invasive aquatic species are a major problem in lakes, rivers and harbors -- protecting them is both not called for under this section of the Clean Water Act and would be in conflict with the Administration's inter-agency effort to deal with invasive species.

2. EPA does not indicate whether the 1% is based on numbers of organisms or total biomass.

3. EPA does not indicate whether the impingement or entrainment of more than 1% represents adverse environmental impact.

4. An arbitrary cutoff of 1% ignores the varying abilities of species to reproduce, maintain recruitment and generally compensate for environmental stresses so as to maintain healthy and stable populations.

5. It is not likely that it is possible to measure the number of individuals or the amount of biomass in "the area immediately around the intake" precisely enough to judge compliance with a 99% protection level.

Further, AF&PA remains unclear as to the population EPA has targeted for protection. The proposal repeatedly refers to "the area immediately around the intakes" suggesting that EPA may consider the population to be limited to the individuals residing within this area and may be attempting to protect 99% of these organisms. If so, it stands in stark contrast to the approach EPA uses in the whole effluent toxicity (WET) testing program. AF&PA notes that the population targeted for protection in the WET testing program consists of all downstream organisms. Thus, the population being protected by the WET testing regulations is much larger than the near field population. The removal of one percent of the organisms from the near field population will certainly have little if any impact on the overall downstream population. EPA either needs to clarify that the targeted population is comprised of all organisms in the downstream reach of river, or allow much more than one percent of the near field population to be removed.

More importantly, removals of any magnitude are important only to the extent that they impact population viability. The tools allowing one to examine the potential impacts of removals on population viability are under development at EPRI. AF&PA encourages EPA to use the tools under

development at EPRI or similar tools to facilitate this population-level analysis, which should be the basis for establishing the acceptability of entrainment and impingement.

The utility industry has offered a sound technical case for recognizing the biological compensation factors in waterbodies in a wide variety of fish species. The forest products industry joins other industries in supporting this regulatory approach in case-by-case situations where the facilities do not meet the threshold criteria.

AF&PA agrees with the utility industry that AEI must be defined more clearly since the statute requires minimization of AEI. If the EPA does not clearly define AEI, a company potentially will be subject to arbitrary intrepretation of AEI. AF&PA strongly discourages any possible repeat of the perplexing problem from the Superfund program where there was not clarity as to "how clean is clean" from fundamental inconsistencies in the ARARs <FN 20> and EPA policies. Certainty as to what is AEI is fundamental to the future success of the 316(b) program. It is also essential that state permit writers have a clear understanding of AEI.

Footnotes

20 Applicable or Relevant and Appropriate Requirement (CERCLA, Section 121).

EPA Response

Please see response to comment 316bNFR.516.020.

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, today's rule does not interpret AEI in this fashion.

As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory

reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Finally, please see response to comment 316bNFR.516.021 (clarity for permit writers).

Comment ID 316bNFR.062.026

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Theresa Pugh

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Beginning on page 49074 of the preamble, EPA begins a discussion of what an adverse environmental impact is under this rule and presents at least four alternatives for comment. In all cases, EPA seems to require that all populations of aquatic organisms be protected. This approach appears to judge all species to be in equal need of protection. Research by the electric power industry and others have demonstrated that this is seldom the case.

EPA's third alternative, for instance, points to language used by the state of New York requiring that no organisms be entrained. One of the reasons New York gives for this stringent requirement is that such taking "might increase nuisance species" (page 49074 and 49075 of the preamble). This is an overly simplistic view of the potential impacts of entrainment and impingement. At some sites, the organisms impinged will be primarily nuisance species, introduced species or species that frequently have large die-offs due to other causes.

Populations of carp, gizzard shad, zebra mussels, Corbicula (asiatic clam) and others fit into this category .The idea that taking any or even 1% of these organisms from the population is harmful does not appear to be consistent with the intention of the 316(b) provisions of the Clean Water Act. Instead, this indicates a need for a more site-specific approach with sensible and clear methods to identify the populations or community to be protected.

EPA Response

Please see response to comment 316bNFR.516.020 and the preamble to the final rule. With respect to the comment that some organisms are nuisance species, EPA notes that cooling water intake structures do not discriminate among organisms and thus the presence of nuisance organisms does not obviate the requirement that cooling water intake structures have location, design, construction, and capacity technologies that reflect BTA for minimizing AEI.

Comment ID 316bNFR.062.027

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

On page 49075 of the preamble, EPA asks for comments on whether to apply a standard of adverse impact similar to 316(a). This should be encouraged since this approach would be less confusing to regulators and the regulated alike. More importantly, however, the 316(a) approach is preferred because it focuses on the maintenance of balanced indigenous populations of fish, shellfish, and wildlife rather than on individual organisms.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.007, 316bNFR.068.008, and the preamble to the final rule.

Comment ID 316bNFR.062.028

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

AF&PA has met with the electric power industry and is persuaded by the thoroughness of their work on a number of matters related to both the littoral zone and the location issues and how the locations drive regulatory determinations. We are in agreement with the utility industry that the proposed approach to AEI contains many overly simplistic assumptions made about the littoral zone, spawning and nursery habitats in the littoral zone, and the requirement to move the cooling water intake structure 50 meters outside the littoral zone.

The factors which contribute to one area being more sensitive than another area to intake effects are so numerous and complex that they can only be dealt with on a site-specific basis. The concerns over the littoral zone in the proposed rule will result in an overly stringent regulatory program and the possible retrofit of cooling water intake structures where it is not necessary. We urge EPA to seriously consider EEI and UWAG's views. These policy assertions made by the utility industry are based upon a decade of studies made by individual utilities as well as EPRI. AF&PA is in agreement with the utilities that the current method of site-specific ecology evaluations of a cooling water intake structure's location is more protective of aquatic life.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.062.029

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 12.0

Best Technology Available-Flow and Volume

AF&PA has considered the work of the electric power industry (through Edison Electric Institute, UWAG and EPRI). AF&PA is in agreement with the utility industry's recommendations for looking at withdrawals on a case by case basis for facilities that do not meet the threshold as defined by AF&PA's suggested language for the final New Facility rule. AF&PA believes that EPA should seriously consider the results of many studies and policy recommendations offered by the electric power industry following the November 9, 2000 comment period deadline.

AF&PA met with Geoff Grubbs, Director, Office of Science and Technology on October 11, 2000 and discussed the merits of this additional research which will be provided to EPA shortly after the comment period closes. Mr. Grubbs informed AF&PA that he has communicated in writing that EPA will seriously consider the additional comments offered by UWAG, EEI and its members on this and related issues following the official close of the comment period deadline. Mr. Grubbs asserted that he believed the UWAG, EEI and EPRI research materials would arrive in a timely fashion to consider for this rulemaking. AF &PA supports EPA's serious consideration of these comments and appreciates EPA's willingness to accept this information after the comment period closes.

EPA Response

EPA appreciates the supplemental information provided by the commenter in support of EPA's effort to craft a final rule. All information submitted to the docket by the commenter was considered prior to today's final rule.

Comment ID 316bNFR.062.030

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 10.021

Request for Comment: Intake Velocity Limitation

AF&PA has reviewed the recommendations offered by the electric power industry and agrees with their views on the 0.5ft/second requirement.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Also see responses to comment 316bNFR.068.080, 316bNFR.068.081, 316bNFR.068.082, 316bNFR.068.106, 316bNFR.068.107, 316bNFR.524.037, 316bNFR.524.038, 316bNFR.524.039, 316bNFR.524.040, 316bNFR.524.041 and 316bNFR.524.042 for responses to comments by the electric power industry.

Comment ID 316bNFR.062.031

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

For structures that exceed the AF&PA supported thresholds under the New Facility proposed rule, AF&PA further supports a tiered approach to assessment and remediation. The initial tier should involve studies to determine best decisions on location and design requirements as a function of the impact found. The tiered approach for assessment and remediation requires a clearer definition of AEI for this system to work.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. EPA has discussed AEI in the preamble to the final rule and indicated that it can include, but is not limited to, impingement and entrainment of fish and shellfish. See Sections III and VI.B of the preamble to the final rule.

Comment ID 316bNFR.062.032

Subject Matter Code	4.1
Universe of Potentially Regulated Entities	

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Confirmation That EPA Intended to Exclude NAICS Code 321 (corresponding to SIC 24) for Wood Products Segment.

AF&PA has commented in prior opportunities that EPA should not include the wood products segment of the forest products industry in this rulemaking. Often these entities and their associated mills are very small. The likelihood of them approaching or exceeding the applicability trigger levels is small.

AF&PA's reading of the proposed rule is that these segments were not included in the proposed rule. AF&PA simply wants to confirm that neither the Proposed Rule on New Facilities nor the secondary rule on Existing Facilities will cover the industry segments. AF&PA believes the inclusion of these NAICS (previously called SIC codes) was an error made by EPA contractors during the Section 316(b) Screener Survey.

Data in the EPA docket <FN 21> demonstrate that SIC code 24 facilities use very little water. According to EPA's docket only 2-3% of facilities in SIC code 24 have cooling water. Clearly, EPA would be on firm footing in excluding SIC code 24 from the scope of coverage in this rule making. We believe EPA would have an even stronger rationale for excluding this industry segment from the proposed rule for Existing Facilities.

Footnotes

21 EPA 316(b) docket, DCN-1-1051 TC.

EPA Response

The commenter wants to confirm that neither the Proposed Rule on New Facilities nor the rule on Existing Facilities will cover the industry segments in NAICS code 321 (SIC code 24). EPA cannot confirm this statement.

EPA conducted a detailed analysis of those industry segments with a high likelihood of having facilities that exceed the applicability triggers. As confirmed by the commenter, it is unlikely that wood products facilities will exceed the thresholds of two MGD and 25% of intake water used for cooling purposes. However, because EPA believes that the economic analysis supporting the rule generally shows these requirements are economically practicable, and because EPA has provided a variance if a facility demonstrates its costs are wholly disproportionate to those considered by EPA in this rule, every new facility that meets all the applicability requirements established by the proposed §316(b) New Facility Rule will have to comply with the rule.

With respect to the Rule for Existing Facilities, EPA believes that comment is outside the scope of this rule.

Comment ID 316bNFR.062.033

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

The New Facility rule's EEA vastly underestimates the potential cost to the forest products industry.

EPA chose not to include in their New Facility compliance cost estimate the one or two paper mills indicated by AF&PA as possibly being constructed over the next two decades.

The total capital cost estimated for the New Facility rule might be only several million dollars for only two theoretical greenfield facilities that might be constructed over the next 10-20 years if waste heat costs related to closed cycle cooling were considered. At this point, annual operating costs have not been estimated for New Facilities. In addition to the technology installation costs, the EEA estimates that initial permitting costs will be on the order of $50,000 for the cooling water intake structure requirements per permit.

The industry's only experience with a 316(b) study was approximately five years ago. This study cost $35,000 and was relatively simple. AF&PA estimates that sampling to meet the most nominal of 316(b) biological study requirements would be in the range of $50,000-$100,000 (year 2000 dollars) in future years. This sampling cost does not include the costs for BTA or for the permit application. Public hearings would certainly drive this cost figure higher.

AF&PA believes an excessive cost burden for New Facilities would result from an interpretation of closed cycle cooling that does not recognize the reuse of cooling water at process water applications in manufacturing facilities. (See AF&PA's comments on process and cooling water in section I.F). If the definition of closed cycle cooling does not recognize the reuse of cooling water as process water, the cost to heat additional surface water for process applications will likely exceed, perhaps by a wide margin, the industry's cost to install technologies designed to reduce impingement and entrainment.

If the energy losses due to abandoning the use of waste heat of process water heating were added to the associated costs in the New Facility rule, the cost could be substantially higher, possibly by several million dollars. Thus, the New Facility rule could be a significant and perhaps insurmountable hurdle for new construction because of the additional heating costs for process purposes.

EPA Response

Contrary to the statement made by the commenter, EPA has included in the New Facility compliance cost estimates two new facility paper mills to be constructed over the next two decades.

EPA recognizes that reuse of cooling water as process water (and vice versa) meets the goals of capacity reduction for the purposes of reducing entrainment of aquatic organisms. The final rule includes in the definition of cooling water an exclusion for water that is reused in this manner with respect to the calculation of the percentage of intake water used for cooling. Therefore, the cost of heating additional surface water is not relevant for cost estimates of the final rule, as EPA estimates

that all in-scope manufacturing facilities, including new facility pulp and paper manufacturers, will be able to comply with the capacity, velocity, and proportional flow aspects of the rule through reuse, recycling, and recirculation of cooling water. However, EPA's conservative cost estimates for the new facility pulp and paper relating to the flow reduction requirements of the rule, nonetheless, estimate that the manufacturing facilities will incur costs equivalent to the installation of wet cooling towers. For the case of most manufacturing facilities within the scope of the rule that incur the capital costs of installing cooling towers, EPA's costs are on the same order as those estimated by the commenter: several million dollars.

Since proposal, as discussed in the NODA, and in response to comments, EPA has revised the cost of the comprehensive demonstration studies. EPA appreciates the data provided by the commenter and considered it during the revision of the study costs. EPA notes that comprehensive demonstration studies are only required for the Track II compliance option. Consequently, EPA projects that 38 of 121 facilities (29 of which are manufacturers) may incur the costs of the studies discussed in the comment.

Comment ID 316bNFR.062.034

Subject Matter Code 24.3

EEA - Plant Construction Costs

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

The industry profile section of the report (Chapter 2) is based on data from the early 1990's, some of which has become obsolete. It is particularly incorrect to indicate that the industry enjoys a strong competitive position internationally, in part because of favorable exchange rates.

1. The U.S. paper industry has been severely hurt by rising imports and the related mill closures -- particularly with respect to some of the printing-writing grades -- and falling exports. The strong dollar has been a major cause of these trade reversals. In particular, the U.S. trade deficit with respect to paper and paperboard rose from 2.2 million tons in 1996 to 6.7 million tons in 1999. The paper industry's trade deficit measured $23 billion in 1999.

2. The U.S. industry is competing with paper from low-wage countries at a time when the U.S. dollar is strong vis-à-vis the currencies of most major paper trading countries. In addition, the rapid expansion of the U.S. merchandise trade deficit means that many products that would have been packaged in U.S.-made boxes are now being packaged abroad.

3. These structural changes have resulted in a myriad of mill closures, particularly in the containerboard grades, and concomitant employment losses. Some 23,000 jobs, or 11% of the primary paper and paperboard workforce, have been lost during recent years due to mill closures, low operating rates, and other factors. The forest products industry is also faced with higher energy costs than offshore competitors and more restrictions on the wood supply in the U.S.

EPA Response

EPA appreciates the information provided by the commenter. EPA noted a number of competitive pressures facing the U.S. pulp and paper industry in Chapter 4: Profile of Manufacturers accompanying the proposed rule, and has updated the profile based on more recent economic data to support the final rule. The more recent data support the commenter's statement that the paper industry has experienced falling exports and rising imports. These conditions, along with slowed growth in the U.S. economy as a whole, are consistent with EPA's expectation that no new greenfield primary paper mill facilities are likely to be built in the U.S. in the near future. In response to comments, however, EPA has assumed for purposes of analysis that two greenfield facilities might be constructed, to provide a conservative estimate of potential impacts on paper manufacturing facilities.

Comment ID 316bNFR.062.035

Subject Matter Code	24.4
EEA - Estimation of Regulatory Alternative Costs	

Author Name Theresa Pugh

Organization American Forest & Paper Assn.

EPA should make the following revisions to the EEA' s discussion of the economic and engineering costs or impacts to the forest products industry.

1. Costs of the New Facility proposed rule for the pulp and paper industry (NAICS 322110, 322121, 322121, 322122, 322130 and 322130) should consider the economic costs based upon the facility size where the facility (not company) has fewer than the 700 employees level for triggering SBREFA. Although the SBREFA statute normally provides for consideration of the costs based upon the company size, the New Facility 316(b) rule should consider the costs of facilities by mills with fewer than 700 employees by mill size, not company size. This is because the New Source rule might be a deterrent to the construction of a greenfield site in the pulp and paper industry where profit margins are slender and changing. Companies will asses each greenfield mill on its stand alone (not company-wide) financial viability. For example, a New Facility might decide not to locate in a location where the additional burden of meeting the 316(b) control requirements, permitting costs, and studies combined with new energy costs would make the investment less attractive.

2. The New Facility proposed rule outlines some rather stringent controls and studies that would be imposed in this segment (NAICS codes listed above) that would make a new facility siting less likely. Although AF&PA offered comments to EPA regarding the economic prognosis and estimated number of New Facilities (new greenfield operations) in the next decade; it is impossible to predict the next twenty years.

3. A cost impact threshold of 1% of revenues is inappropriate for the pulp and paper industry. In recent years, the pulp and paper industry's net after-tax profits in SIC 26 has averaged just 3% of sales from 1990-1999.<FN 22> In an industry with such small margins, a cost test of 1% of sales is inappropriate for expenditure having no return on investment.

4. It is important to recognize that the U.S. paper industry has been in a financial struggle during recent years due, in part, to mounting foreign competition. Imports of paper have followed a steady upward path ever since the Asian financial crisis. The increased inflow of imports has hurt the companies' bottom lines, leading to depressed equity values and a wave of consolidations. It is imperative, given the financial environment facing the paper industry, that any additional spending be carefully considered.

5. Cost of groundwater in the next two decades may make the use of surface water necessary for manufacturing and commercial purposes -- especially in states with low rainfall or drought conditions. EPA's EEA underestimates the impact of the increasing costs of use of groundwater for manufacturing purposes. EPA needs to understand and respect local, site-specific conditions where, even under 316(b), the state regulatory agencies prefer that the manufacturing community use surface water. While this is a cost issue, it is also a regulatory policy issue. State concerns about protection of groundwater are resulting in restrictions on the use of groundwater for cooling water purposes.

Footnotes

22 AF&PA data.

EPA Response

EPA disagrees with the commenters claim that EPA's analysis should consider the economic costs based upon the facility size where the facility (not company) has fewer than the 700 employees level for triggering SBREFA. The small entity determination under SBREFA is always made at the level of the firm, not the level of the facility. EPA will therefore continue to use this analytic approach for the final rule analysis. However, EPA has assessed financial viability independently of the SBREFA analysis. EPA used annualized compliance costs as a percent of annual revenues ("cost-to-revenue ratio") at the facility-level as a measure of economic impacts for manufacturing facilities (see analysis in Chapter 7: Economic Impact Analysis of the Economic Analysis document). This analysis provides the information on the stand-alone financial viability of each mill referred to by the commenter. The results of this analysis show negligible economic impacts on projected new facilities in the paper and paper industry.

The commenter also expresses concern about the "rather stringent controls and studies that would be imposed in this segment (NAICS codes listed above) that would make a new facility siting less likely." Again, EPA's economic analysis shows that the cost burden of the final rule is very small compared to estimated facility revenues. EPA therefore does not believe that the final rule would make new facility siting less likely.

Finally, EPA agrees that it is difficult to estimate the number of new facilities that will be built over the next twenty years. EPA based its analysis on the best available information and took into account insights provided by the commenter who stated that they "don't anticipate significant new construction for our industry" and that they "only imagine one of two "greenfield" facilities constructed over the next decade" (see comment 316bNFR.062.002).

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Charles A. Bedell

On Behalf Of:

Murphy Exploration & Production Co.

Author ID Number:

316bNFR.063

Note

Fully supports the comments made by API (316bNFR.028)

Comment ID 316bNFR.063.001

Subject Matter Code MISC

Miscellaneous Comment

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

Our review of the proposed rule has led us to agree with the API's conclusion that the proposed rule contains serious conceptual and technical flaws which would result in substantial and unnecessary costs being incurred by our members and many other industries. It seems clear that, in preparing this proposed rule, the EPA did not concern itself with the operations of the offshore oil and gas exploration and production segment of the petroleum industry. The proposed regulation does not consider the specialized cooling water requirements of offshore drilling platforms and the adverse effects that the imposition of this rule would have on domestic offshore petroleum exploration and production operations.

Although the language in the proposed regulations only addresses new facilities, recognizes that retrofitting may be impracticable or even impossible and clearly states that requirements for existing facilities must be different from those for new facilities; past agency conduct leaves Murphy concerned that EPA will soon move to consider many of the underlying principles of the regulation to be applicable to existing offshore oil and gas facilities.

Given that many of the underlying assumptions and requirements of the proposed rule are either flawed or inappropriate for any offshore oil and gas facility, new or existing, we urge the EPA rescind the proposed rule and rewrite it to apply to a well defined industry or group of industries, which would not include the offshore oil and gas exploration and production industry.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.063.002

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

Subject Matter Code 9.4

Adverse Environmental Impact

EPA has not defined adverse environmental impact, which is the explicit requirement that must be achieved by best technology available, as defined in Section 316(b) of the Clean Water Act (CWA). In the absence of a definition of adverse environmental impact, it is impossible to determine the best technology available, its cost, and its effectiveness. For this reason, if no other, the proposed rule is deficient and cannot be promulgated in its current form.

EPA Response

Please see response to comment 316bNFR.009.001.

Comment ID 316bNFR.063.003

Subject Matter Code 9.44

Request for Comment: Definition of AEI

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

Adverse environmental impact must be defined based on effects on aquatic communities, not effects on individual organisms.

EPA Response

Please see response to comment 316bNFR.029.013 and the preamble to the final rule.

Comment ID 316bNFR.063.004

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

An appropriate de minimis cooling water intake flow threshold for rule applicability must be defined. The proposed threshold of 2 million gallons per day (MGD) is completely unsupported by any of the entrainment and impingement studies cited by EPA in the proposed regulation. The studies are all on large facilities in the steam electric power generation industry and cannot be used to justify the 2 MGD threshold. API recommends an intake threshold of 30 MGD which would cover 99 percent of the existing cooling water use according to EPA's own estimates.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements

imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.063.005

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

EPA should regulate cooling water intakes that are subject to the rule on a site-specific basis. As pointed out in our comments and those of other stakeholders, site-specific conditions are the most important determinants of whether or not entrainment and impingement in a cooling water intake will have an adverse environmental impact on the aquatic community at the site.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.063.006

Subject Matter Code MISC

Miscellaneous Comment

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

EPA did not consider the unique designs and operations of offshore oil and gas exploration and production platforms when it developed the proposed rule. These facilities use cooling water drawn from the ocean and could be subject to the requirements of this rule because, in general, the intake flows of many facilities exceed EPA's proposed applicability de minimis threshold of 2 MGD.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.063.007

Subject Matter Code MISC

Miscellaneous Comment

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

EPA's proposed regulation could also apply to existing offshore mobile drilling platforms, which are moved from one oil and gas facility to another. Both mobile and stationary OCS facilities are regulated under a general NPDES permit. These existing platforms could be considered to be "new sources" in accordance with EPA's effluent guidelines program, and as such would have to comply with the proposed cooling water intake regulation. There are more than 200 of these mobile rigs currently in operation moving from location to location or facility to facility in U .S. waters. Requiring them to perform the environmental studies and retrofit the best technology available as specified in this rule would be infeasible or impossible.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.063.008

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

Subject Matter Code 10.03

Additional Littoral Zone Requirements

EPA's definition of the "littoral zone" of surface waters, which defines areas in which the most stringent best technology available would apply, is not scientifically supported. The assumption that all nearshore areas in every river, lake, estuary, tidal river, and all ocean waters over the continental shelf are highly sensitive and important aquatic habitat and nursery areas is not supported by available scientific evidence. The importance of the local habitat to the aquatic community of a particular surface water body can only be determined on a site-specific basis.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.063.009

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

API supports EPA's determination that zero intake of cooling water is not a technically feasible alternative for many locations and types of cooling water use. We note that EPA's evaluation of zero cooling water use focused on steam electric power plants. If the Agency had looked at the heat dissipation needs of manufacturing industries, they would find that zero cooling water intake would be even more difficult to justify.

EPA Response

See response to comment 003.002.

Comment ID 316bNFR.063.010

Author Name Charles A. Bedell

Organization Murphy Exploration & Production Co.

Subject Matter Code 13.1

Requirement of 0.5 fps

API does not support a uniform design intake velocity of 0.5 feet per second for cooling water intakes. The data cited by EPA do not support the uniform application of this criterion to all cooling water intakes. For offshore oil and gas operations, this low velocity would result in the fouling of the cooling systems by marine organisms would render them inoperable.

EPA Response

See response to comment 316bNFR.028.031 for information regarding biofouling issues and offshore oil and gas facilities.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Brian M. Harney

On Behalf Of:

ExxonMobil Refining & Supply

Author ID Number:

316bNFR.064

Comment ID 316bNFR.064.001

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Brian M. Harney

Organization ExxonMobil Refining & Supply

Our review has led us to conclude that the proposed rule contains serious conceptual and technical flaws that would result in substantial and unnecessary costs being incurred by our facilities and many other industries.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. EPA believes this approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration when designing new facilities.

Comment ID 316bNFR.064.002

Subject Matter Code EXIST

Existing Facility Rule

Author Name Brian M. Harney

Organization ExxonMobil Refining & Supply

Although the proposed regulations only address new facilities, ExxonMobil is concerned that EPA will consider many of the underlying principles of the regulation to be applicable to existing facilities. We appreciate that the Agency has clearly stated that requirements for existing facilities must be different from those for new facilities, as retrofitting may be cost prohibitive or even impossible. Nevertheless, we are concerned about the implications of this rule for the scope of the upcoming proposed rule for existing facilities, given that many of the underlying assumptions and requirements of the proposed rule are either flawed or inappropriate for any facility - new or existing.

EPA Response

Today's final rule addresses only new facilities. EPA will address existing facilities in Phase II of this rulemaking. See preamble of today's final rule for a discussion of the scope and applicability of the rule.

Comment ID 316bNFR.064.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Brian M. Harney

Organization ExxonMobil Refining & Supply

EPA has completely ignored the unique operations of the offshore oil and gas exploration and production segment of the petroleum industry. The proposed regulation does not consider the specialized cooling water requirements of offshore drilling platforms and the adverse effects that this rule would have on offshore petroleum exploration and production operations. The Offshore Operators Committee (OOC), the International Association of Drilling Contractors (IADC), and the American Petroleum Institute (API) are submitting comments on these specific issues. ExxonMobil fully supports the comments of those three organizations.

EPA Response

See response to comment 316bNFR.022.001.

Comment ID 316bNFR.064.004

Author Name Brian M. Harney

Organization ExxonMobil Refining & Supply

Subject Matter Code 9.4

Adverse Environmental Impact

* EPA has not defined adverse environmental impact, which is the explicit requirement that must be achieved by best technology available, as defined in Section 316(b) of the Clean Water Act (CWA). In the absence of a definition of adverse environmental impact, it is impossible to determine the best technology available, its cost, and its effectiveness. For this reason, if no other, the proposed rule is deficient and cannot be promulgated in its current form.

EPA Response

Please see response to comment 316bNFR.009.001.

Comment ID 316bNFR.064.005

Author Name Brian M. Harney

Organization ExxonMobil Refining & Supply

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

* EPA should regulate cooling water intakes that are subject to the rule on a site-specific basis. Site-specific conditions are the most important determinants of whether or not entrainment and impingement in a cooling water intake will have an adverse environmental impact on the aquatic community at the site.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.064.006

Subject Matter Code MISC

Miscellaneous Comment

Author Name Brian M. Harney

Organization ExxonMobil Refining & Supply

EPA did not consider the unique designs and operations of offshore oil and gas exploration and production platforms when it developed the proposed rule. These facilities use cooling water drawn from the ocean and would be subject to the requirements of this rule because, in general, their intake flows exceed EPA's proposed applicability de minimis threshold of 2 MGD.

EPA Response

See response to comment 316bNFR.022.001.

Comment ID 316bNFR.064.007

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Brian M. Harney

Organization ExxonMobil Refining & Supply

* EPA's definition of the "littoral zone" of surface waters, which defines areas in which the most stringent best technology available would apply, is not scientifically supported. The assumption that all nearshore areas in every river, lake, estuary, tidal river, and all ocean waters over the continental shelf are highly sensitive and important aquatic habitat and nursery areas is not supported by available scientific evidence. The importance of the local habitat to the aquatic community of a particular surface water body can only be determined on a site-specific basis.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kaitilin Gaffney

On Behalf Of:

Center for Marine Conservation

Author ID Number:

316bNFR.065

Note

No comments coded for this letter, as it was replaced by another submission. CMC comments are coded under 316bNFR060.

Comment ID 316bNFR.065.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Kaitilin Gaffney

Organization Center for Marine Conservation

No comments coded for this letter, as it was replaced by another submission. CMC comments are coded under 316bNFR060.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

John W. Shipp, Jr.

On Behalf Of:

Tennessee Valley Authority

Author ID Number:

316bNFR.066

Comment ID 316bNFR.066.001

Subject Matter Code SUP

General Statement of Support

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

With regard to its proposed rule, TVA compliments EPA on its recognition of the significance of location; its recognition of the differences inherent in different waterbody types; its submission and solicitation of comments regarding the concept of restoration measures in this regulatory arena; its statement that this proposed rule should not be used as guidance for new or existing sources during the rulemaking period; its solicitation of comments on the definition of "Adverse Environmental Impact" (AEI), and whether or not it needs to be defined for the purposes of this rulemaking; its solicitation of comments on alternatives other than its proposed alternative; and its removal of mandatory restoration measures as a BTA requirement.

EPA Response

EPA appreciates these general comments and explains the basis for the revisions it has made to proposal in the NODA and preamble to the final rule.

Comment ID 316bNFR.066.002

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.001.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.003

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.001.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.004

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.001.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.005

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.001.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.006

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.001.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.007

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.001.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.008

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

TVA remains concerned, as expressed during interagency discussions, that the proposed rule is based on some incomplete and inaccurate information and perceptions, and contains some inaccurate, misleading, and/or incomplete statements and facts. The Questionnaire data is yet to be analyzed, case studies are yet to be conducted, and there are 18 additional technical projects and 3 workshops of which TVA is aware that are underway or in stages of development, which will provide history, data, analyses, and insights pertinent to this rulemaking. TVA encourages participation by EPA staff in all 316(b) related technical workshops.

As specific examples related to the concern expressed above (introductory sentence of the preceding paragraph), page 49088 of the proposed rule states that "The mortality rate of entrained organisms is high." While at one time scientists assumed this to be true, empirical data now indicates that mortality rates are highly variable, and 100% survival has been reported for a number of sites and species. (A comprehensive survey of the open literature, as well as previously unpublished data, has been conducted for EPRI.) A stated EPA basis and assumption is that "organisms . . . are subject to mechanical, thermal, and toxic stress." A more correct basis would be that they "may be" subject to such stresses. A second example of incomplete information and discussion and perception is the section on "Velocity" (beginning on page 49087). While velocity has long been recognized and studied as a factor in impingement, certainly there are (at least) 3 other primary factors of equal or greater importance: (1) location of the CWIS relative to productive and important fishery resources, (2) the health/condition of fish upstream and in the vicinity of the CWIS (i.e., many impinged fish have already been weakened or killed by environmental factors), and (3) whether or not healthy and susceptible fish are attracted to the CWIS. Only the 2nd of these primary factors is acknowledged in the proposed rule's "velocity" discussion -- albeit in an understated manner. (The UWAG has commissioned a narrative presentation of factors influencing impingement and entrainment.) It is also important to note that some researchers have found the 0.5 fps velocity criterion not to be as uniformly applicable as they once thought. (Note that EPRI commissioned researchers at the Oak Ridge National Laboratory to evaluate the history and applicability of the 0.5 criterion.) A third example of inaccurate and incomplete and misleading information is on page 49085. The statement that "the magnitude of entrainment impacts is directly related to the capacity or intake flow (or volume) . . ." is inaccurate. More accurate statements would be that "there is often some relationship between flow and risk of entrainment impact," and "flow can be a contributing factor to entrainment impacts." In some cases, higher once-through type flows lead to minimal entrainment impacts! -- and conversely, some low flow systems lead to higher entrainment impacts. In addition, the statement (true) that "mortality and injury rates can be high" would be more accurately portrayed if it continued "although reported mortality rates are highly variable (0-100%) depending on the species, sizes, and life stages entrained, and the specifics of the operational variables listed above." Lastly, the indication that "one way to minimize . . ." would be more holistically presented if it acknowledged other means of eliminating or minimizing entrainment AEI (including locating the CWIS away from spawning and nursery areas, maintaining high survival through the plant, capturing organisms on screens and returning them to the source waterbody, using mechanical means (e.g., in situ screens) to keep entrainable organisms from entering the CWIS, and utilizing restoration).

EPA Response

EPA has used the best information available for the proposed and final rule. There are few records documenting impingement and entrainment rates at the majority of existing facilities. In most cases updated information was not available, however, to the extent possible, EPA has supplemented the facility information in the record for this final rule to include smaller facilities and updated information.

EPA maintains that both impingement and entrainment survival depend on numerous factors including, but not limited to, the species of fish, life stage, swimming ability, and the type of technology employed at the facility to minimize impingement and entrainment. Moreover, EPA has provided documentation which demonstrates that entrainment mortality rates for selected species and life stages can be as high as 100 percent. See section VI.B of the Preamble for additional discussion of this issue.

EPA believes that the 0.5 ft/s velocity requirement is well supported by existing literature on fish swim speeds, is protective of aquatic resources with a reasonable margin of safety, and is being met by many recently constructed facilities. Further, EPA believes that it is uniformly applicable in that 60 percent of electrical generating facilities built in the last 15 years have met this requirement which is an appropriate component of best technology available for minimizing adverse environmental impact.

The Agency recognizes that there are many possibilities for minimizing AEI. Under Track I of today's rule, there is no distinction among the different waterbody types at which an intake may be sited. Thus, all intakes will be subject to the same technology-based performance standards that seek to minimize entrainment and impingement. Should a facility choose to follow Track II of today's rule, they can show that site-specific conditions and/or applied technologies will allow them to achieve a level of reduction in impingement and entrainment comparable to the same level achieved under Track I. Thus, today's rule provides a flexible option for facilities that do not project high impingement or entrainment losses within their respective waterbodies.

It is the Agency's position that the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including populations and communities. Further, the proposition that flow is related to entrainment is well supported in the record. (See documents DCN# 2-029, 2-013L-R15, and 2-013J in the record for this rule for support of EPA's position on these issues.)

Please see Response to Comment 316bNFR.056.005 and sections III and VI.B of the preamble for additional discussion of the above issues.

Comment ID 316bNFR.066.009

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

Subject Matter Code 10.0

Best Technology Available

TVA is also concerned, and feels that EPA and stakeholders should be as well, that many currently-operating steam-electric generating plants could not be built and operated as they are today under the proposed rules – despite the fact that monitoring studies have concluded that they are not causing adverse environmental impact. None of TVA's 16 steam-electric generating stations would meet all of EPA proposed new-source requirements; yet, impact assessment studies have been conducted at all 16 sites, reports have been submitted to EPA, NRC, and/or state regulators and other stakeholders, and with a restoration project at one site the satisfaction with the lack of adverse environmental impact is such that no current NPDES permits contain requirements to continue 316(b) studies or to modify CWISs. It is questionable public policy to create requirements which would preclude the construction of a needed power generating facility at a site when it could be operated without AEI.

Note that there is concern within TVA, and among many Valley stakeholders, for adverse impacts caused by any sources. TVA conducts monitoring in all of its reservoirs, and in many rivers and streams, and maintains watershed teams in all of its 11 major watersheds. In coordination or cooperation with partners and stakeholders in the watersheds, it conducts assessments and seeks solutions to prioritized water quality, fishing, and aquatic habitat problems. TVA and its partners and teams find, as did the President's Clean Water Action Plan investigations, that habitat destruction, loss of wetlands or wetland functions, and non-point source pollution are the major sources of adverse impact to water resources.

EPA Response

Today's final rule does not apply to existing facilities as defined in Section I.A. The permit decisions referenced above were made prior to establishment of national Section 316(b) requirements. See proposed rule Section VIII.A.1 and final rule Section II.C.4 for discussions on the limitations of the existing 316(b) permitting approach. The final rule imposes technology-based requirements on new facilities that EPA's record demonstrates are available and economically practicable for new facilities. The Agency understands that existing facilities would have less flexibility in designing and locating their cooling water intake structures than new facilities and that existing facilities might incur higher costs to comply with the requirements required of new facilities. This will be taken into account when the forthcoming regulations are developed for existing facilities.

In the final rule for new facilities EPA is establishing a two-track technology-based approach that establishes specific capacity, velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment of fish, shellfish, eggs, and larvae and requires the applicant to select and implement design and control technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish and shellfish (Track I). To provide for site-specific needs Track II allows a facility to conduct a comprehensive demonstration study to show that alternative controls will meet the same impingement and entrainment reduction levels that would be achieved by a shoreline intake meeting the Track I requirements at the same site. If a facility finds

that its CWIS poses little impact the Track II option is appropriate.

EPA does not feel that these requirements would preclude a plant being built since the two-track approach allows a facility to meet the requirements of the rule by implementing technologies best suited for a particular set of site-specific issues. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of also allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive for the development of innovative, site-specific technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

EPA acknowledges that there are multiple sources of adverse environmental impacts to water sources in addition to impingement and entrainment such as habitat destruction, loss of wetlands or wetland functions, and non-point source pollution. This regulation was developed to minimize impingement and entrainment impacts because impingement and entrainment constitute one form of adverse environmental impact as discussed in Section VII of the proposed rule and again in Section III of this final rule.

Comment ID 316bNFR.066.010

Subject Matter Code 10.0

Best Technology Available

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

TVA encourages EPA to produce a final rule which is driven by good empirically-based science and good public policy; one which requires a specific nationally-consistent process (versus mandatory specific national BTA standards); one which will be based upon prevention of AEI (i.e., protection of threatened, endangered, or otherwise listed species; protection of populations of socially, recreationally, and commercially important species; and protection of community integrity (structure and function); and one which will continue to demonstrate that environmental protection and sustainable economic development are not incompatible. The rule should not be driven by the mere availability of technologies, or by reluctance or inability on the part of some regulatory agencies, or by any past difficulties in implementation. With regard to the latter point, there are assessment tools, clarified fishery ecological concepts, and impact assessment and fishery management data available now which were not available during the initial implementation of 316(b).

EPA Response

EPA disagrees that the new facility rule should be environmentally-based rather than technology-based because the record demonstrates that for new facilities, the requirements of this rule are overwhelmingly technologically available and economically practicable as evidenced by the large number of new facilities planning independently of this rule to install technologies that would meet the requirements of this rule. Moreover, by taking a technology-based approach to the new facility rule with firm objective endpoints rather than more subjective endpoints such as population effects, EPA is able to speed up the process of permit decision making which will speed up permitting for new facilities. (It is not that EPA wants permitting of existing permits to linger, but that existing NPDES permits are administratively continued under section 558(c) of the CWA; and thus delay in those permits does not delay the continued operation of the facility. By contrast, until a permit is granted, a facility cannot operate and also EPA understand that obtaining a permit make obtaining financing for a facility less costly.) EPA may well take a different approach in the existing facility rule, where retrofit costs are make the same requirements much more costly. EPA did not use a population impact as an endpoint for measuring the performance of technology, because EPA's experience and the experience of the State permitting authorities nationally has been that there is significant transaction cost to such an approach which is not helpful to expeditious permitting of new facilities. In addition, elsewhere in this rulemaking record, EPA addresses the uncertainties and complexities of population modeling. However, to increase flexibility where the Track 1 technologies are not the applicant's preferred approach, the final rule establishes a two-track technology-based approach. This approach does impose both BTA requirements and a flexible process to meet the requirements while addressing site-specific considerations. EPA believes the two-track approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing new facilities.

Comment ID 316bNFR.066.011

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.010.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.012

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.010.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.013

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.010.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.014

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.010.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.015

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.010.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.016

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

This comment was incorporated into 316bNFR.066.010.

EPA Response

No Response Necessary.

Comment ID 316bNFR.066.017

Subject Matter Code 10.01

Regulatory Framework Options

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

A major specific concern with the proposed rule is that the BTA specified includes redundant measures to minimize impingement and entrainment. There are at least 6 conceptual ways in which to minimize both impingement and entrainment, and it is often not necessary to invoke more that one of these measures in order to minimize impingement or entrainment impacts. For example, if a plant utilizes wet cooling towers to minimize its intake flow (and thereby minimize entrainment AEI), it is often not necessary to also implement additional technologies to minimize entrainment. TVA would also point out that the environmental protection issue here is entrainment mortality --not entrainment of organisms. Therefore a single mitigatory measure which adequately reduces or replaces entrainment mortality is sufficient to accomplish the purposes of Sec 316(b). The same principles apply to impingement as well. Note that NRC Regulations state that entrainment of fish and shellfish in early stages and impingement of fish and shellfish at facilities with cooling-tower-based heat dissipation systems "have not been found to be a problem at operating nuclear plants with this type of cooling system and are not expected to be a problem during the license renewal term." NRC further concludes that for the entrainment and impingement issues at facilities with this type heat dissipation systems, "environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource." These conclusions are contained in the Code of Federal Regulations Title 10, Part 51, Subpart A, Appendix B, and are based on data contained in NUREG-1437. "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (May 1996).

EPA Response

EPA does not believe that the performance standards are redundant - they are additive. EPA is to minimize impacts to the smallest amount and additional measures may be warranted for site-specific conditions.

EPA does not agree that entrainment and impingement "have not been found to be a problem at operating nuclear plants with this type of cooling system and are not expected to be a problem during the license renewal term" or that "environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource." EPA believes that the examples of environmental impact provided in the proposed rule are illustrative of the types of effects associated with cooling water intakes (see Section VII of the proposed rule). Potential benefits associated with reducing impingement and entrainment are discussed in Section IX of this final rule.

Comment ID 316bNFR.066.018

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

TVA is concerned that the proposed rule relies too heavily on the use of the littoral zone as a surrogate for biological sensitivity and the potential for AEI. The fact that the text discussion to adequately and accurately portray the ecological role of the littoral zone requires so many qualifying adjectives (e.g., “generally,” “except,” “not typically,” “many but not all,” “some,” “often”), and the fact that the littoral zone may comprise a significant, and therefore not unique, portion of the source waterbody, is indicative of why a site-specific approach is needed for assessing the potential for/risk of AEI, and for making BTA decisions.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.066.019

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

TVA is quite concerned that this proposed rule is currently constructed to minimize (redundantly, we reiterate) impingement and entrainment, as opposed to minimizing AEI, as required by the Act. Furthermore, TVA feels that AEI can be defined, and has presented a conceptual definition to EPA staff (as stated in paragraph 7 of this e-mail document {316bNFR.066.010}). TVA is working with others to produce a peer-reviewed document on the definition of AEI, along with a viable screening approach(s) for use by EPA and all stakeholders. If after screening, it is determined that there is risk of AEI, the permittee must choose to either make a definitive AEI investigation and decision, or to proceed directly to a BTA decision. A definitive AEI decision should be made in accordance with EPA's published and prescribed ecological risk assessment/risk management approach. (As has often been discussed with EPA 316(b) rulemaking staff, the permittee should be able to proceed directly to a BTA decision-making process at any time the applicant deems this appropriate or necessary.)

EPA Response

EPA appreciates the opportunity to work with TVA and other federal partners throughout the 316(b) rulemaking process.

Please see responses to comments 316bNFR.029.013 and 316bNFR.040.004. Although EPA does not agree that AEI decisions must be made in accordance with ecological risk assessment or risk management approaches exclusively, EPA does believe that today's technology-based two-track framework provides facilities with the flexibility to choose specified performance-based standards (Track I) or performance standards that account for site-specific conditions relevant to assessing impingement and entrainment reductions (Track II).

Comment ID 316bNFR.066.020

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

As stated in the June 28th interagency meeting, TVA believes that there should be the option of a tailored BTA determination—a site-specific determination of alternative BTA location, design, and capacity criteria (with EPA specified criteria serving as the default). This tailored approach would account for situations in which prescribed location criteria were not synonymous with important biological resources, singular rather than redundant measures were adequate to minimize potential impingement and entrainment impacts, and alternative design criteria were appropriate. The burden of proof of the adequacy of a tailored BTA would rest with the permittee, following guidance or study plans developed or approved by EPA and/or state permitting authorities.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.066.021

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

Subject Matter Code 12.22

Potential for Additional Measures for Unique Situations (Great Lakes)

As stated in the Interagency meeting, many stakeholders feel that 316(b) rules need to treat the Great Lakes as a distinct source waterbody type.

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.066.022

Subject Matter Code 15.13

Discretionary/Voluntary Approaches

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

As indicated at one of EPA's public meetings on this rulemaking, TVA strongly recommends the inclusion of discretionary and voluntary restoration measures as a means to accomplish the purposes of 316(b). While it is not a CWIS technology per se, it clearly is a means to minimize or eliminate AEI. Potential advantages of restoration over CWIS technology changes include the fact that restoration benefits can be much broader in scope (often restoring wholeness to ecosystems that plant technology can not); can exist in perpetuity (i.e., beyond the life of the power generation facility) ; can avoid mechanical breakdowns or failure to meet performance specification problems; and can often offer fishery management flexibilities in implementation. TVA was involved in a very successful restoration project associated with one of its steam-electric facilities.

EPA Response

See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.066.023

Subject Matter Code	20.2
Monitoring Requirements	

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

In light of EPA's current proposal which intends to minimize impingement and entrainment (versus AEI), TVA finds no justification in baseline and permit renewal monitoring designed to assess impacts to the source waterbody. Under such a prescriptive and redundant scenario, the only in situ monitoring which is indicated and justified is (1) that which is necessary to evaluate which "additional" control technologies to employ, and (2) operational monitoring of the BTA measures sufficient to ensure that they are functioning as designed. In situ monitoring to evaluate AEI within the source waterbody is only indicated in those alternative approaches in which BTA decisions are based on the minimization of waterbody AEI. And even in such cases, the specific requirement for biweekly monitoring is not indicated. Some of the most recently developed and comprehensive monitoring tools (e.g., multimetric biocriteria and sport fishing indices) require monitoring only once, or twice, per year, in conjunction with commonly collected fishery management data.

EPA Response

EPA disagrees with TVA and believes periodic monitoring is appropriate to minimize impingement and entrainment. At § 125.87, today's final rule requires biological monitoring and visual or remote inspections at all facilities. Both Track I and Track II facilities must conduct biological monitoring for impingement and entrainment to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. These data would also be used by the permitting authority in subsequent permit terms to determine whether additional or modified design and construction technologies are reasonably necessary. The facility would be required to conduct impingement and entrainment sampling over a 24-hour period no less than once per month when the cooling water intake structure is in operation and report results to the Director annually. After two years, the Director may approve an applicant's request for less frequent biological monitoring if the facility provides data to support the request showing that less frequent monitoring would still allow for the detection of any seasonal and daily variations in the species and numbers of individuals that are impinged or entrained. The Director should approve a request for reduced frequency in biological monitoring only if the supporting data show that the technologies are consistently performing as projected under all operating and environmental conditions and less frequent monitoring would still allow for the detection of any future performance fluctuations.

The examples of monitoring mentioned by the commenter (i.e. biocriteria, and sport fishing indices) are typically conducted on an annual or semi-annual basis due to the fact that they are population-level or assemblage-level monitoring tools. Response time (or time required to detect change) at the population or assemblage level is typically long. The monitoring required under the rule is at the individual or species-level (i.e. impingement/entrainment sampling), which can vary considerably over a short span of time (e.g. monthly or seasonally). As a result, the frequency of monitoring mentioned above has been prescribed for new facilities.

Comment ID 316bNFR.066.024

Subject Matter Code	CP
Comment Period	

Author Name John W. Shipp, Jr.

Organization Tennessee Valley Authority

TVA again encourages EPA to preserve a sufficient period for federal interagency review (a minimum of 90 days) before the final rule is issued.

EPA Response

EPA appreciates the desire to have as much time a possible for Federal interagency review. However, this new facility rule is under a court order deadline which provides for a very short time between the proposal and final action. Given these circumstances, the Office of Management and Budget has agreed to an expedited 60 day review period.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Steven Smith

On Behalf Of:

ABB Energy Ventures, Inc. & Oak Point
Energy, LLC

Author ID Number:

316bNFR.067

Comment ID 316bNFR.067.001

Subject Matter Code	5.2
Existing Facilities/Facilities Under Construction	

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

ABB has serious concerns about EPA's proposed 316(b) rules. First, wholly aside from their substantive requirements, the proposed rules would seriously disrupt the permitting schedule for the Oak Point Project. Under EPA's proposal, the new standards would apply to all facilities that commence construction after the effective date of the rule. If EPA promulgates new 316(b) rules before the Article X permitting proceeding has been completed -- and thus before Oak Point even would be authorized to commence construction -- Oak Point likely would need to re-design the Project to comply with whatever may be required under the new rules, and could be forced to start the permitting process all over again. Moreover, even if no re-design were required, the permitting process would have to be halted for more than a year while Oak Point conducted the "source water baseline biological characterization" that would be required under EPA's proposal. Delays of this magnitude could undermine the economic viability of the Project. More generally, by requiring facilities that already have been designed and are under review by permitting authorities to comply with the new standards, EPA effectively will be imposing a moratorium of 2-3 years or more on the construction of much needed electric generation capacity at a significant social and environmental cost. ABB therefore urges EPA to amend the proposed rule to provide that it does not apply to any facility for which an application or an NPDES permit has been filed and determined to be administratively complete prior to the effective date of the rule.

EPA Response

For a discussion on today's rule effective date and the impact on an already ongoing permit application process, see comment 316bNFR.202.013. EPA designed the definition of new facility to fit with existing NPDES regulations and used the definition of commence construction on 40 CFR Part 122 so that the same date would apply for intakes as applies for discharge purposes. EPA notes that the new facility definition is narrower than the new source definition that it applies to greenfield and stand--alone facilities, but not a major modification of existing facilities. Although EPA lacks enough information with which to comment on the commenter's specific situation regarding the Oak Point project, EPA points out, today's rule does not contain a year of monitoring requirement under Track I, which is an option available to an applicant who has concerns regarding timing of a project. EPA's record also indicates that only nine facilities are projected over twenty years to not be planning to use closed-cycle cooling in the baseline. Thus, it is unlikely that many, if any, facilities will have to redesign their new facility mid-stream. EPA's record indicates that this facility is not a facility that would need to redesign midstream. Even if the facility was planning once-trough cooling, EPA believes that Track II and the alternative requirement provisions are likely to provide sufficient flexibility for this facility. Finally, EPA notes that whenever there is a new regulation, even if there is an extended effective date, there has to be a cutoff date at some point in time.

Comment ID 316bNFR.067.002

Author Name	Steven Smith
Organization	ABB Energy Ventures, Inc. & Oak Point Energy, LLC

Subject Matter Code 10.01

Regulatory Framework Options

ABB also questions the substance of EPA's proposed 316(b) rules. EPA's proposal to impose national minimum standards for the location and design of cooling water intake structures would impose significant economic, environmental, and social costs on the generation of electricity with no demonstration in the record of any commensurate scientifically proven environmental benefit. ABB believes that Section 316(b) should be implemented through a case-by-case, site-specific approach that encourages development and use of innovative and environmentally sensitive technology to minimize adverse environmental impact that may result from cooling water intake structures. Alternatively, if EPA believes that it must adopt some national standards regarding the location and design cooling water intake structures, the agency also must provide for a variance to those minimum standards for any facility at which, due to the unique characteristics of the relevant waterbody and/or the use of innovative technology, less stringent requirements would not result in any greater overall adverse environmental impact.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. For new facilities subject to this rule EPA believes the two-track approach represents the best technology available for minimizing adverse environmental impact.

In this final rule Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II does provide an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

EPA considers the examples of environmental impact provided in the proposed and final rules (Sections VII and III, respectively) as illustrative of the types of effects associated with cooling water intakes. Potential benefits associated with reducing impingement and entrainment are discussed in Section IX of this final rule.

Comment ID 316bNFR.067.003

Subject Matter Code	5.2
Existing Facilities/Facilities Under Construction	

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

The Final Rules Implementing Section 316(b) Should Not Apply to Facilities Designed and Under Permit Review Prior to the Effective Date of the Rules.

As proposed, the new rules implementing Section 316(b) of the Clean Water Act would apply to any new facility "that commences construction after [the effective date of the final rule]." <FN 2> Applying the rules in this manner would impose an unwarranted and potentially devastating burden on projects that are actively under permit review at such time as the final rules may be promulgated. If the rules were to be applied as proposed, they would effectively put a halt to all ongoing permitting actions while applicants re-designed their projects to comply with whatever requirements EPA eventually may adopt. Even if, out of sheer fortuity, a project's existing design was in compliance with the requirements of the new rules, the requirement to conduct a source water baseline biological characterization alone would delay the permitting process for more than a year.

Delays of this magnitude can be very costly for a major power plant project, and in some cases could fatally undermine the project's economic viability. The development of such a facility requires the investment of millions of dollars in engineering and design efforts, and legal and consultant fees to prepare the extensive documentation for the permit applications and to participate in the permitting process, before any construction of the facility could commence. As a result, it is a mistake to focus, as EPA's proposed applicability provisions would do, on the commencement of construction. A developer must commit very substantial resources to a power plant project before the first shovel is put to the ground. The costs of carrying these expenses for an additional year or two before the project begins to generate revenues can be the difference between a profitable development and project that is financially under water.

The potential delay associated with the need to comply with new rules implementing Section 316(b) is particularly problematic for the Oak Point Project. The real estate and financing arrangements for the project were structured based on the permitting schedule associated with the Article X siting process in New York, which is governed by statute. Under that process, Oak Point could expect to receive a final decision on its permit application by the first quarter of 2002. At the time these real estate and financing arrangements were made, Oak Point could not have known that EPA would propose a major regulatory initiative that not only would change the substantive permitting requirements, but would completely disrupt the normal permitting schedule for the Project. Even if EPA were to promulgate final rules as soon as the end of next summer -- an ambitious schedule given the agency's obligation to review and respond to the extensive comments likely to be submitted on this proposal -- the Article X permitting process for the Project would be more than halfway to completion, and Oak Point will have invested substantial resources in that effort. A delay in the permitting process of a year or more at that point very likely could kill the project.

It is fundamentally unfair to impose this kind of financial burden on the Oak Point Project. Oak Point has proceeded with the Project in good faith under the rules that have been in place for years. The

rules should not be changed in the middle of the game. Nor can EPA take the position that once Oak Point had notice of the proposed new rules, it should have revised the Project's design and revamped its permitting strategy accordingly. EPA itself acknowledges that:

[b]ecause the Agency is inviting comment on such a broad range of alternatives for potential promulgation, today's proposal is not intended as guidance for determining the best technology available to minimize the adverse environmental impact of cooling water intake structures at new facilities before the Agency promulgates final regulations based on today's proposal. In the interim, [state permitting authorities] should continue to make section 316(b) determinations, which may be more or less stringent than today's proposal, on a case-by-case basis applying best professional judgment. <FN 3>

It is rather disingenuous for EPA to suggest, on the one hand, that its proposal changes nothing, and that permit applicants and permitting authorities should proceed under the existing regulatory regime, and on the other hand to apply the new rules in a way that will effectively render such efforts futile except for those few projects for which the permitting process can be completed and construction commenced before EPA' s other shoe comes down in the form of a final rule.

Footnotes

2 Id. at 49116 (proposed definition of "new facility" under Section 125.83).

3 Id. at 49064 (col. 1).

EPA Response

See response to comments 316NFR.067.001 and 316bNFR.202.013 for discussions on the timing and effective date of today's final rule.

Comment ID 316bNFR.067.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Steven Smith

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The Proposed Rule Fails to Include a Proper Definition of "Adverse Environmental Impact."

EPA's proposed rule does not include a definition of "adverse environmental impact." <FN 5> The fair and consistent application of Section 316(b), however, requires a commonly-understood, scientifically-justifiable concept of "adverse environmental impact." Otherwise, there is no basis for the regulated public or the permitting authorities to evaluate the extent to which a facility's withdrawal of water may have such an impact, or whether the location and design of the facility's cooling water intake structure reflect the best technology available to minimize any such adverse impact. This situation invites arbitrary and inconsistent permitting decisions.

Footnotes

5 65 Fed. Reg at 49074 (col. 2).

EPA Response

Please see response to comment 316bNFR.009.001. EPA believes that the clarity of the Track I approach and the use of impingement mortality and entrainment reduction as the metric to evaluate the performance of Track II technologies will enhance rational and consistent permitting decisions.

Comment ID 316bNFR.067.005

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

Although EPA has not included a definition of "adverse environmental impact" in the text of the proposed rule, it has solicited comment on several possible definitions that it is considering for inclusion either in the final rule or in guidance that supports the final rule. ABB does not endorse any of the specific alternatives described by EPA in the preamble to the proposal. Rather, ABB proposes a variation on the second and fourth alternatives discussed by EPA: adverse environmental impact should be defined generally as a statistically significant reduction, at the population level, in the abundance or diversity of aquatic life that inhabit the waterbody in the vicinity of the intake structure that is the result of impingement or entrainment. Whether and to what extent a given facility's intake structure would cause adverse environmental impact should be determined on a case-by-case, site-specific basis, with careful consideration of the individual ecological and resource factors involved.

The definition of "adverse environmental impact" also should take into account nonaquatic impacts -- such as increased air emissions, noise, and extraction and depletion of fuel and other natural resources -- that may be associated with cooling technologies that require the withdrawal of relatively smaller quantities of water. Nothing in the language of Section 316(b) indicates that Congress sought to minimize effects on aquatic organisms without regard to other potential environmental impacts related to the location and design of cooling water intake structures. That provision refers generally to "adverse environmental impact," not merely "adverse impact to aquatic resources." Congress thus clearly intended that "minimization" of adverse environmental impact would involve balancing among competing environmental considerations.

EPA Response

Please see responses to comments 316bNFR.507.004 (AEI interpretation/population studies), 316bNFR.014.013 (two-track framework), 316bNFR.501.003 (nonaquatic impacts) and section VI.B.2 of the preamble for more discussion of AEI, nonaquatic environmental impacts, and alternative requirements under today's rule.

Comment ID 316bNFR.067.006

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Steven Smith

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ABB specifically objects to two of the alternative approaches that EPA is considering for defining "adverse environmental impacts" that EPA discussed in the preamble to the proposed rule. One such approach would be to define adverse environmental impact as "the impingement or entrainment of one (1) percent or more of the aquatic organisms in the near-field area."<FN 6> This approach is flawed in two respects. First, it focuses on the number of organisms that are impinged or entrained, rather than on the effects of such impingement or entrainment on the abundance or diversity of these organisms at the population level in the waterbody. Impingement and entrainment do not necessarily result in population level effects. Natural mortality in fish populations is high; most species produce large quantities of young of which only a small percentage is expected to survive to maturity. In addition, reproductive processes fluctuate in response to variations in environmental conditions that affect mortality rates; reproduction rates can increase to compensate for environmental conditions resulting in greater mortality. As long as there is no material reduction in the fish populations in the vicinity of the intake structure, the number of fish impinged is not itself a relevant consideration. In addition, the "near field area" is an unduly narrow area in which to measure the percentage of impingement or entrainment. One percent of the organisms found in the near field area may represent an insignificant percentage of the organisms inhabiting the general vicinity of the facility.

EPA also is considering an approach that would define adverse environmental impact as "any impingement or entrainment of aquatic organisms."<FN 7> Like the "one percent" approach, this approach improperly focuses on individual organisms, rather than population level effects. EPA suggests that the loss of a single organism "could have the potential to reduce the population of indigenous species" or "change the species mix because some species are more susceptible to impingement,"<FN 8> thus implicitly acknowledging that adverse impact ultimately is measured in terms of the abundance and diversity of species at the population level. EPA should define "adverse environmental impact" directly in these terms, not according to some proxy that may or may not be a valid predictor of population level effects.

Footnotes

6 65 Fed. Reg at 49074 (col 2-3).

7 65 Fed. Reg at 49074 (col. 3) (emphasis added) EPA characterizes this as the approach followed by New York State. Although this may represent the views of one official within the New York Department of Environmental Conservation's Division of fish, Wildlife & Marine Resources, it does not necessarily represent the governing standard for issuance of discharge permits under Article X.

8 65 Fed. Reg at 49075 (col. 1)

EPA Response

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, today's rule does not interpret AEI in this fashion.

Please see response to comment 316bNFR.507.004 and preamble section VI.B.2. for a discussion of EPA's interpretation of AEI under today's rule and EPA's concerns over the uncertainty associated with population-level assessments.

Comment ID 316bNFR.067.007

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

EPA's Imposition of National Minimum Standards Based on Broad Categories of Waterbodies is Arbitrary and Overbroad.

Under EPA's proposed rule, the specific minimum standards for the location and design of cooling water intake structures for new facilities would vary depending upon the classification of the waterbody in which the intake structure would be located. EPA proposes to classify all waterbodies in one of the following four categories: (I) freshwater river or stream, (2) lake or reservoir, (3) estuary or tidal river, and (4) ocean. EPA proposed this structure because EPA "considers location to be the most important factor in addressing adverse environmental impact caused by cooling water intake structures." <FN 9> EPA states further that "[b]ecause different water body types have different potential for adverse environmental impact, the requirements proposed to minimize adverse environmental impact would vary by water body type." <FN 10>

This classification system rests on the presumption that all waterbodies within a given category are susceptible to the same level of adverse environmental impacts due to the withdrawal of water through a cooling water intake structure, and require the same technology to minimize such adverse environmental impacts. This presumption is not justified by any facts in the record for this proposal. For example, EPA's proposed rule would impose the most stringent minimum for intake structures located in estuaries and tidal rivers because "estuaries and tidal rivers have the highest potential for adverse impact because they contain essential habitat and nursery areas for many species."<FN 11> The term "estuaries and tidal rivers" encompasses a large variety of waterbodies with potentially widely differing characteristics. There is no basis to assume a priori that all such waterbodies require the identical level of regulatory protection, and there is no indication in the record that EPA made any scientifically valid study to determine that the proposed minimum standards are necessary or appropriate for every waterbody falling within the definition of "estuary or tidal river."

For example, the Oak Point Project is proposed to be sited on the Upper Reach of the East River. The East River is part of the New York Harbor-Long Island Sound-New York Bight Estuary. The Upper Reach of the East River, however, does not provide the "abundance of habitat, food, and refuge" that, according to EPA, are typically associated with an estuarine environment and that promote the development of early life stages of aquatic communities.<FN 12> For example, the volume of water introduced into this section of the East River from freshwater tributaries is small compared to the amount introduced by tidal action. As a result, this area does not have the level of biological activity typically present in an estuarine environment. In addition, tidal current velocities in the East River have been measured to be in excess of 5 knots. Such strong tidal currents discourage fish and other aquatic organisms from inhabiting the waterbody, resulting in a relatively lower potential for impingement. Moreover, the Upper Reach of the East River has been designated as a "significant maritime and industrial area" in which energy generation is a recommended and encouraged use.<FN 13> As a result of these factors, the East River does not in fact provide the kind of "essential habitat and nursery areas for many species" that is EPA's stated rationale for imposing the most restrictive

standards for intake structures located in estuaries or tidal rivers. Given this rationale, it is arbitrary for EPA to impose the same minimum standards for intake structures in the East River as in a pristine waterbody that has lower tidal currents, greater water volume introduced from freshwater tributaries and no historical industrial use.

Footnotes

9 65 Fed Reg at 49076 (cot. 2).

10 Id. at 49078 (cot. 1).

11 Id.

12 Id. at 49084 (col. 2).

13 The Oak Point Project site is within Reach 7 of the Upper East River. Pursuant to the New York City Waterfront Revitalization Plant, adopted pursuant to the federal Coastal Zone Management Act of 1972 and the New York State Waterfront Revitalization and Coastal Resource Act of 1981, Reach 7 has been designated a "significant maritime and industrial area" ("SMIA"). Policy 2 of the New York City Waterfront Revitalization Plan is to "support water dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation." Energy generation facilities are expressly mentioned as an encouraged use under Policy 2. Standard 2.1(A) provides that actions which "would inhibit the efficient operation of the SMIAs as industrial or maritime areas should be avoided," while Standard 2.1(B) provides that the City should "maintain sufficient manufacturing zoning in SMIAs to permit heavy industrial uses essential to the city's economy and the operation of utilities, energy facilities, and city services.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

See also response to comment 316bNFR.006.005.

Comment ID 316bNFR.067.008

Subject Matter Code	10.01
	Regulatory Framework Options

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The proposed differentiation of national minimum standards for intake structures based on broadly defined categories of waterbodies is an overbroad framework that fails to account for wide variations in the potential for adverse impacts among waterbodies within a given category. EPA should abandon this proposed classification system in conjunction with the adoption of case-by-case, site-specific approach for implementing Section 316(b), as described further below. At most, these categories should serve as a general guide for the determining the proper means to minimize adverse environmental impacts from a given intake structure; they should not be used rigidly to impose a particular set of standards without regard to the appropriateness of such standards given the unique characteristics of a specific waterbody.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Also see response to comment 316bNFR.006.005.

Comment ID 316bNFR.067.009

Subject Matter Code	10.01
	Regulatory Framework Options

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The Proposed Standards Are Not Sufficiently Related to Minimizing Adverse Environmental Impact from Entrainment and Impingement.

EPA has proposed a number of specific national standards regarding the location and design of cooling water intake structures which EPA asserts represent the minimum restrictions necessary -- in every case -- to minimize adverse environmental impacts associated with intake structures. These restrictions primarily take the form of limitations on the volume and velocity of water that can be withdrawn through the intake structure. Because they do not take into account the complex interaction of biological, environmental, and engineering factors that bear on environmental impacts resulting from a cooling water intake structure within a particular waterbody, these restrictions are likely to be overbroad, and possibly counter-productive, in many cases.

Moreover, these restrictions do not focus directly on potential adverse environmental impacts. The volume and velocity of water withdrawn through an intake structure do not themselves represent adverse environmental impacts. Rather, EPA assumes that volume and velocity will affect the number of organisms that are impinged or entrained in the intake structure. In many circumstances, however, volume and velocity are not valid indicators of the potential for adverse impact from impingement or entrainment. It is a fundamental principle of administrative law that there must be a rational connection between an agency's action and the stated basis for that action.<FN 14> By relying on volume and velocity as proxies in all cases for impingement and entrainment, EPA's proposed standards fail to satisfy this requirement.

Footnotes

14 An agency action is invalid under the APA if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). An agency does not satisfy this standard unless it "examine[s] the relevant data and articulate[s] a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made." Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Insurance Co., 463 U.S. 29, 43 (1983) (quoting Burlington Truck Lines, Inc. v. United States, 371 U.S. 156, 168 (1962)).

EPA Response

EPA disagrees and contends that volume and velocity are valid indicators of the potential for adverse impact from impingement and entrainment. EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental

impact at new facilities. Furthermore, EPA has described potential adverse environmental impacts associated with cooling water intake structures in the proposed rule (Section VII) and again in the final rule (Section III).

Comment ID 316bNFR.067.010

Subject Matter Code	12.3
	Estuaries/Tidal Rivers

Author Name Steven Smith

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Flow and Volume

EPA's proposed regulations would impose varying limitations on the volume of water that may be drawn through a cooling water intake structure, depending on the category of waterbody in which the intake structure is located and the particular location of the intake structure within the waterbody. The most stringent limitations would apply to intake structures located in estuaries or tidal rivers. Intakes structures located anywhere within these waterbodies would be subject to two separate flow limitations. One requirement would be that "[t]he total design intake flow from all cooling water intake structures at [the] facility must be no greater than one (1) percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level."<FN 15> The second requirement would be that the facility must reduce "intake flow to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system."<FN 16> EPA's stated purpose for limiting the flow or volume of water through cooling water intake structures is to minimize the adverse environmental impact from entrainment.<FN 17> EPA's focus on flow rate is misplaced because flow rate does not always correlate positively with entrainment.

Although the amount of water that flows through an intake structure may have an effect on the number of organisms that are lost through entrainment, it is only one of many factors that must be considered. Whether and to what extent the withdrawal of water will result in adverse environmental impact from entrainment depends also on factors such as variations in the presence of organisms in the water column due to variations in temperature, salinity, tides, light (day vs. night); individual species characteristics such as fecundity, habitat preferences, behavioral patterns; and the entrainment survival rates of individual species likely to be entrained in a given location. In fact, the volume of flow into the intake structure can be largely irrelevant to the overall magnitude of entrainment effects. In some cases, the specific location of the cooling water intake structure within a given waterbody is the critical factor influencing the potential for adverse environmental impact as a result of entrainment.<FN 18> A cooling water intake structure located in an area of low biological productivity will cause minimal entrainment regardless of the quantity of water withdrawn. For example, on a waterbody suffering from poor water quality unrelated to the facility, whether the facility draws one percent or fifty percent of the water column centered about the intake structure may be inconsequential, as there is no significant aquatic life present in the waterbody. In addition, establishing a percentage flow limitation presumes a uniform distribution of entrainable organisms throughout the waterbody, which is not likely to be the case in most waterbodies. Certainly, there are no facts in the administrative record for the proposed rule to support such a presumption. EPA's proposed flow standards do not permit consideration of these kinds of site-specific factors, and thus are not sufficiently tied to the underlying purpose of the rule -which is not to restrict flow per se, but to minimize adverse environmental effects from entrainment.

The requirement that facilities withdrawing cooling water from estuaries or tidal rivers reduce their

intake flow to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system likewise may be unnecessary in many cases to serve EPA's stated purpose of minimizing adverse effects from entrainment. A well-designed once-through cooling system employing innovative intake technologies to promote the survival of entrained organisms may be able to achieve overall levels of mortality from entrainment that are no greater than would result from the use of a closed-cycle system, notwithstanding the higher volume of water required for the once-through systems. The issue is not how many organisms are drawn into the intake structure, but how many organisms are lost as result. Innovative technologies that return entrained organisms to the waterbody unharmed effectively mitigate any adverse impact that otherwise might be attributable to the entrainment of these organism. By assuming that lower flows always will result in lower overall adverse effects from entrainment, however, EPA's proposed rule would preclude any consideration of the application of such technologies.

Footnotes

15 65 Fed. Reg. at 49118 (proposed Section 125.84(d)(1)(i)).

16 65 Fed. Reg. (proposed Section 125.84(d)(1)(iii)).

17 65 Fed. Reg. at 49085.

18 Seacost Anti-Pollution League v. Costle, 597 F2d 306,309-10 (151 Cir. 1979) (finding the potential impacts to winter flounder in an estuary would not be adverse where, among other factors, most winter flounder larvae would be carried out of the estuary on the prevailing tidal current bearing southward rather than northward toward the intake).

EPA Response

Firstly, under Today's final rule EPA is no longer imposing varying limitations on the volume of water that may be drawn through a cooling water intake structure, depending on the category of waterbody in which the intake structure is located and the particular location of the intake structure within the waterbody. EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Secondly, EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. EPA disagrees

with commenters that other factors influential to impingement and entrainment have been ignored. Both Track I and Track II of the final rule allow for site-specific evaluations in determining the appropriate technologies to be implemented. For example, the Design and Construction Technology Proposal Plan required in Track I and the Evaluation of Potential Cooling Water Intake Structure Effects in Track II allow for site specific consideration of factors other than flow to minimize impacts from impingement and entrainment. Cumulative impacts are addressed on a case-by-case basis by each permitting authority.

EPA expects that this final regulation will reduce impingement and entrainment at new facilities. The final rule establishes requirements that will help preserve aquatic organisms and the ecosystems they inhabit in waters used by cooling water intake structures at new facilities. EPA has considered the potential benefits of the rule; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures. The preamble discusses these benefits to the extent possible in qualitative terms.

Comment ID 316bNFR.067.011

Subject Matter Code	10.021
Request for Comment: Intake Velocity Limitation	

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Velocity

EPA's proposed rule would impose a maximum design intake velocity of 0.5 ft/s for all cooling water intake structures located in an estuary or tidal river.<FN 19> The purpose of this limitation is to minimize impingement by ensuring that fish can escape the influence of the cooling water intake. There are several problems with the proposed 0.5 ft/s limitation. First, there is not a sufficient scientific basis to support the 0.5 ft/s figure. EPA adopted this figure based on a single study of fish swimming speeds and endurance which found that the particular species and life stages evaluated could endure a velocity of 1.0 ft/s. The results of this single study cannot be assumed to be representative of all waterbodies and all species. Even if such a generalization were proper, EPA arbitrarily applied a "safety factor" of two to the 1.0 ft/s threshold to derive a threshold of 0.5 ft/s. <FN 20> There is no scientific basis in the record to support a safety factor of this magnitude. Indeed, EPA acknowledges that "there are also species for which a velocity of greater than 0.5 ft/s would still be protective." <FN 21>

In addition, the proposed 0.5 ft/s restriction would apply to the design intake velocity - i.e., the velocity measured just as the organisms are passing through the intake opening,<FN 22> EPA acknowledges, however, that it is the "approach velocity" (which is measured just in front of the screen face or at the opening of the cooling water intake structure) that "has the most influence on an aquatic organism and its ability to escape from being impinged or entrained by the cooling water intake structure."<FN 23> EPA further acknowledges that the design intake velocity "is always greater than the approach velocity because the net open area is smaller."<FN 24> Thus, a design intake velocity of 0.5 ft/s will result in an even lower approach velocity. This kind of limitation simply cannot be rationally justified on the basis of data indicating that fish can endure an approach velocity of 1.0 ft/s.

Finally, although the design intake velocity certainly has an effect on impingement, it is not the sole factor. The geometry of the intake system, the swimming speeds and endurance of the particular species likely to be found in the vicinity of the intake structure, the behavior of the fish in response to weather conditions, light intensity (day vs. night), the presence of various fish life stages during the spawning season, and the location of the intake in an area of biological productivity and in relationship to suitable habitat all potentially have a greater influence on impingement and entrainment rates than intake water velocities. Equally important is the application of new technologies to increase the survival rates of impinged organisms. If a relatively high percentage of the fish caught in the influence of the intake structure are returned unharmed to the waterbody, the overall adverse environmental impact from impingement resulting from a well-designed once-through cooling system would not necessarily be any greater than that which would result from the use of a closed-cycle system operating at a lower intake velocity. Once again, however, EPA's proposed standards do not even permit the consideration of these factors.

Footnotes

19 65 Fed. Reg. at 49118 (proposed section 125.84(d)(1)(ii)).

20 65 Fed. Reg. at 49118

21 65 Fed. Reg. at 49088 (col. 1)

22 65 Fed. Reg. at 49088 (col. 1)

23 65 Fed. Reg. at 49088 (col. 1)

24 65 Fed. Reg. at 49088 (col. 1)

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

These data were compiled from over 120 species and represent a broad cross section of fish species, each with different swimming abilities. These data provide a comprehensive basis for the velocity requirement, as a given facility is more likely to be co-located with multiple species.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

Comment ID 316bNFR.067.012

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

The Proposed Standards Improperly Equate Entrainment and Impingement with Adverse Environmental Impact

EPA's proposed restrictions on flow and velocity assume that adverse environmental impact should be defined solely in terms of the effects from entrainment and impingement of aquatic organisms. That assumption is not valid. To determine whether withdrawal of water will have an adverse environmental impact on a waterbody, it is necessary to assess the overall well-being of that ecosystem, not merely to identify an absolute quantity of entrained or impinged organisms. A seemingly high absolute quantity of entrained or impinged aquatic organisms does not necessarily equate to adverse environmental impact. Due to the naturally occurring phenomenon of compensation, a decline in fish population density can be offset by an increase in reproduction, growth, and survival rates. Although this scientifically recognized phenomenon has certain limitations related to individual species characteristics and habitat availability, it is an important factor to consider- one that EPA has ignored --in evaluating whether a cooling water intake structure is causing adverse environmental impacts.

In addition, as discussed above, adverse environmental impact should not be defined solely in terms of aquatic organisms, but should reflect a balancing of all environmental effects. By effectively requiring the use of closed-cycle recirculating cooling water systems, EPA ' s proposed rule fails to account for potentially significant nonaquatic adverse environmental impacts associated with such systems. Closed-cycle systems are generally not as efficient as once-through cooling, resulting in lower generating efficiency and increased energy consumption and emission of carbon dioxide or other greenhouse gasses. Wet cooling towers result in drift of potentially harmful minerals or other chemicals, and create additional solid waste. Dry cooling systems are even less efficient, and are noisy, aesthetically unappealing, and consume more space.<FN 25> These factors raise issues of environmental justice for the low-income, largely minority community in the area of the Bronx where the Oak Point Project would be located. The balancing of these factors may well indicate that a well-designed once-through cooling system would produce lower overall adverse environmental impact at this location than would a closed- cycle cooling system. EPA's proposed rule, however, does not permit any balancing of potentially competing environmental considerations.

Footnotes

25 For example, the Oak Point Project is estimated to experience generating efficiency losses ranging from approximately 1 to 5 percent, depending on the ambient temperature, from the use of air cooled condensers rather than once-through cooling.

EPA Response

Please see response to comment 316bNFR.501.003.

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory

reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Comment ID 316bNFR.067.013

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

The Proposed Requirements for Baseline Characterization and Monitoring are Unduly Burdensome and Time-Consuming

EPA's proposed rule would require the collection of baseline ambient biological data in the form of a Source Water Baseline Biological Characterization ("SWBBC").<FN 26> The SWBBC is intended to "identify species most susceptible to impingement and entrainment, their life stages, their abundance in the source water, and their environmental requirements and habitat."<FN 27> The information contained in the SWBBC would be used to evaluate the effectiveness of the design and construction technologies for cooling water intake structures at an individual facility. The SWBBC must contain data collected at least one year before the submission of an NPDES permit application, adding significantly to an already lengthy permitting process. In addition, the proposed rule would impose burdensome ongoing monitoring requirements designed to detect seasonal and daily variations in the species and numbers of individuals that are impinged or entrained for at least two years after a facility obtains its permit.<FN 28>

EPA has not demonstrated an adequate need for collection of this data in all cases, nor explained why existing data could not be used where available. For example, the SWBBC requirement assumes that there are no other valid methods for assessing the effectiveness of measures to mitigate adverse impact from entrainment and impingement. Oak Point is considering the use of an intake system that would permit the direct measurement of survival rates of entrained and impinged organisms - analogous to air monitoring systems that measure pollutant concentrations of at the inlet and outlet of control devices to determine the removal efficiency. Such a system would provide a means for evaluating the effectiveness of measures to minimize adverse impact from entrainment and impingement without the need for extensive baseline testing. The preparation of the SWBBC and the additional monitoring requirements also are unnecessarily burdensome for facilities located in waterbodies where use of cooling water intake structures is not likely to have any significant adverse environmental impact. Consistent with the case-by-case approach described below, the specific requirements for data collection and ongoing monitoring should be determined for each facility through discussions between permit applicants and permitting authorities, taking into account the characteristics of the waterbody, and the design of the cooling water system.

Footnotes

26 65 Fed. Reg. at 49119 (proposed section 125.86(a)).

27 65 Fed. Reg., at 49096.

28 65 Fed. Reg.,at 49121 (proposed section 125.87).

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.067.014

Subject Matter Code 125.84.3

Compliance in Estuary

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

The Proposed Standards Are Unclear.

The proposed national standards for cooling water intake structures are unclear in several respect. First, the flow limitation set forth in proposed Section 125.84(d)(1)(i) does not specify a time interval for purposes of volume calculation. It is also unclear how facilities with multiple intake structures would be required to comply with the proposed regulations. In addition, the requirement in Section 125.84(d)(1)(iii) that intake flow must be commensurate with that attained by a closed-cycle recirculating cooling water system is particularly uninformative. The intake flow of a closed-cycle system is not something easily determined or necessarily uniform from system to system. Depending on the design of the system, the manufacturers specifications regarding the frequency with which the system must be flushed and the operating practice of a facility employing a closed-cycle system, the flow intake could vary considerably from system to system. EPA needs to clarify these points if the regulated public is to have a fair opportunity to comply with the proposed standards.

EPA Response

Any restriction on a facility's total design intake capacity is dependent on the categorization of the waterbody from which the facility withdraws cooling water as described below:

For a facility withdrawing water from a lake or reservoir, the total design intake capacity cannot exceed a level which would significantly disrupt the natural thermal stratification, if present and determined to be beneficial to the management of fisheries. Because individual lakes and reservoirs exhibit different characteristics, a specific flow restriction will developed on a case-by-case basis in consultation with the permitting authority. A specific time interval, if any, will be determined by the permitting authority.

For a facility withdrawing water from an estuary or tidal river, the total design intake capacity cannot exceed 1% of the volume of water in the water column defined by one tidal excursion during one tidal cycle of ebb and flood. Tidal cycles can vary from region to region. For example, the Atlantic coast typically experiences semi-diurnal tidal cycles that last approximately 12 hours while the northern Gulf of Mexico typically experiences diurnal cycles lasting approximately 24 hours. A specific time interval will be determined by the most current tide current data published by the National Oceanographic and Atmospheric Administration (NOAA).

For a facility withdrawing water from a freshwater stream or river, the total design intake capacity cannot exceed 5% of the mean annual flow of the source waterbody. The US Geological Survey (USGS) maintains instream flow data for thousands of streams and rivers in the United States. Typically, flow data is represented as a value of "cubic feet per second", though many industrial facilities typically design an intake capacity in units of "million gallons per day."

EPA notes that each of the standards mentioned above applies to the total design intake capacity of the facility, regardless of the number of intake structures a facility may employ.

For a discussion on establishing a design intake capacity comparable to that of a closed-cycle cooling system, please see Chapter 2 of the Technical Development Document for this rule and the response to comment 316bNFR.068.101.

Comment ID 316bNFR.067.015

Author Name	Steven Smith
Organization	ABB Energy Ventures, Inc. & Oak Point Energy, LLC

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Section 316(b) Should be Implemented Through a Site-Specific Approach.

Historically, EPA has implemented Section 316(b) on a case-by-case, site-specific basis. This approach is well-suited to the consideration of the numerous facility-specific factors described above that bear on the determination of "best technology available" ("BTA") for minimizing adverse environmental impacts from cooling water intake structures. This approach also permits appropriate public involvement in the consideration of these factors. EPA does not contend that the case-by-case approach has failed to achieve the objective of Section 316(b) to minimize adverse environmental impacts from cooling water intake structures. Rather, EPA contends that the case-by-case approach places too much demand on the resources of permitting authorities, and could result in inconsistent permitting decisions. Neither of these contentions is a compelling reason to substitute national minimum standards, that are at best unduly restrictive and costly and at worst counter-productive, for reasoned decision making by permitting authorities based on a full array of site-specific considerations.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.067.016

Subject Matter Code	23.3
State Burden and Costs for Permitting Activities	

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

EPA states in the preamble that "[t]he historical case-by-case approach requires significant resources on the part of the regulatory authorities that must implement Section 316(b) requirements. The historical decision-making process requires that each regulated facility must develop, submit and refine studies that characterize or estimate adverse environmental impact." <FN 29> Although a case-by-case approach does require the investment of greater permitting resources than a rigid set of national standards, the saving of permitting resources by means of national standards is a false economy because it does not account for the significant environmental, economic and social costs of requiring new facilities to employ costly cooling processes that may be unnecessary, or counter-productive, to the protection of aquatic resources. An up- front investment of the permitting resources necessary to implement the requirements of Section 316(b) in a manner that is appropriate and cost-effective taking into account the specific characteristics of the facility and the waterbody in question would minimize the overall environmental, social, and economic costs of developing power plants and producing electricity. Surely that is an investment that is worth making. In fact, the permitting costs associated with a site-specific approach are dwarfed by the costs imposing unwarranted limitations on cooling water withdrawals. The additional capital cost to install an air cooled condenser system at the Oak Point Project is estimated to be $65,000,000, which represents nearly 10 percent of the total costs of the Project.

EPA also states that the historical site-specific approach "might" result in greater inconsistencies in permitting decisions than would be the case under a regime of national minimum standards. There is nothing in the record to indicate that the site-specific approach in fact has led to unwarranted inconsistencies in permitting decisions. EPA appears to be basing its decision to abandon the site-specific approach on mere speculation that a problem of inconsistency exists or that such a problem would be remedied by the imposition of national minimum standards. Moreover, what EPA should be striving for is consistently well-informed and scientifically justified permitting decisions. National minimum standards may create the appearance of consistency, as every facility is forced to adopt the same cooling processes, but they are likely to result in permitting decisions that are widely inconsistent in effect due to differences in various site-specific factors. On the other hand, by employing a site-specific approach, with the aid of appropriate technical guidance, permitting authorities will be able to make decisions that befit the individual case, thereby achieving, rather than sacrificing, genuine regulatory consistency.

Moreover, EPA's proposed national minimum standards in fact would neither avoid the need for investment of substantial permitting resources, nor eliminate the use of discretion by permitting authorities that "might" lead to inconsistent permitting decisions. The proposed rules effectively superimpose a case-by-case assessment on top of the minimum standards by requiring new facilities also to implement unspecified "additional design and construction technologies" that minimize impingement and entrainment of fish. <FN 30> Combined with the requirement for extensive data collection and analysis for the source water baseline biological characterization, the permitting resources that would be required to implement the proposed rule would hardly be less than those

required for the current site-specific approach, although without the corresponding benefit of the flexibility inherent in the site-specific approach. At the same time, the requirement for "additional design and construction technologies" introduces the very kind of discretionary decision-making by permitting authorities that EPA contends might lead to inconsistent permitting decisions.

Only a case-by-case, site-specific approach permits the proper assessment of the complex interactions of biological, environmental, and engineering factors that bear on the determination of best technology available for minimizing adverse environmental impact from cooling water intake structures. ABB believes that the historical case-by-case approach has worked well and does not require any significant overhaul. However, of the various alternative approaches considered by EPA in the preamble to the proposed rule, ABB generally supports adoption of the three-tiered approach.<FN 31> In particular, ABB strongly endorses the use of some sort of screening step, such as that contemplated for Tier 1 of the three-tiered approach, before a facility is required to undergo the more time-consuming and resource-intensive efforts required for a full- blown site-specific analysis of BTA. Not all facilities require the same level of permitting scrutiny. In any case where it is evident, on the basis of one factor or another, that the facility in question poses little or no risk of adverse environmental impact from the withdrawal of cooling water, the cooling water intake structure proposed by the applicant should be deemed to be BTA.

Footnotes

29 65 Fed. Reg. at 49079 (col. 2).
30 Id. at 49118.
31 See Id. at 49082.

EPA Response

EPA has fully considered the economic and social costs of the final rule, including energy penalty, air emissions and other non-aquatic environmental impacts, as discussed in sections IV.A, VI.H and VIII.C of the preamble to the final rule. EPA has examined the cost of the final rule as a percentage of annual revenue for purposes of determining whether the requirements are economically practicable, and has concluded that the costs of the preferred two-track option adopted in the final rule are economically practicable and will not pose a barrier to entry for new facilities. Furthermore, the technologies used as a basis for this option are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts.

EPA has not adopted the dry cooling option in the final rule because this option was found not to be cost-effective. The technology of dry cooling carries costs that are sufficient to pose a barrier to entry to the marketplace for some projected new facilities. Dry cooling technology also has some detrimental effect on electricity production by reducing energy efficiency of steam turbines and is not technically feasible for all manufacturing applications. Finally, dry cooling technology may pose unfair competitive disadvantages by region and climate. EPA discusses its reasons for not accepting the dry cooling option in sections V.C, VI.F and VIII.D of the preamble to the final rule.

EPA disagrees with the commenters' assertions that there is no information in the record to indicate that the historical case-by-case, site-specific approach has led to unwarranted inconsistencies in the permitting process, and that this approach has worked well and does not require overhaul. EPA discusses the shortcomings of the current case-by-case approach to 316(b) reviews in section II.C.4

of the preamble to the final rule. The case-by-case approach has proved to be costly, time-consuming and subject to challenge. In addition, approaches to implementing section 316(b) on a case-by-case basis have varied greatly across the states. The majority of states that have commented on the rule favor EPA establishing a national minimum technology requirement that simplifies the permitting burden for new facilities.

Under the final rule, EPA has established its preferred two-track option as the best technology available for minimizing adverse environmental impacts. Track I streamlines the permitting process by establishing a well-defined set of uniform requirements on a national basis that constitute best technology available (BTA) for minimizing adverse environmental impact and can be implemented relatively quickly, thus providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. Track II provides facilities with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I.

EPA recognizes the potential for site-specific factors to influence the suitability of a particular technology for a given facility, and thus has allowed for consideration of site-specific factors in the final rule. Under Track I, EPA anticipates that facilities will determine which specific design and construction technologies to implement based on site-specific factors. Under Track II, EPA anticipates that facilities will use site-specific studies to demonstrate that alternative technologies will achieve the same level of reductions in impingement and entrainment as would be achieved under Track I.

Comment ID 316bNFR.067.017

Author Name	Steven Smith
Organization	ABB Energy Ventures, Inc. & Oak Point Energy, LLC

Subject Matter Code 16.5

Request for Comment: Use of Innovative Technologies

Any National Standards Must Have Flexibility to Permit Alternate Technologies That Are No Less Protective of the Environment.

As proposed, the national minimum standards are highly inflexible. A facility may be relieved of strict compliance with a national standard only where it can be demonstrated that compliance with that standard would result in compliance costs "wholly out of proportion to the costs EPA considered in establishing the requirement at issue."<FN 32> Although it may be true that costs of compliance with the standards in some cases may be out of proportion to the costs considered by EPA,<FN 33> this should not be the only circumstance that would permit a variance from the national standards. Indeed, there is no basis in statute or regulatory policy for EPA to require blind adherence to some national standard where a less stringent alternative standard would provide no less environmental protection.

EPA stated in the preamble to the proposal that it is considering a variance alternative based on the use of innovative cooling water intake structure design and operation to minimize adverse environmental impact. <FN 34> EPA noted that facilities "are using various designs for cooling water intake structures, which consist of passive and other innovative intake systems that use natural flow, gravity, [and] some type of natural or artificial barrier...to reduce impingement and entrainment."<FN 35> ABB strongly endorses the inclusion of an appropriate variance provision to encourage the development and use of these innovative intake structure technologies. ABB believes that it will be able to employ innovative intake structure technologies at the Oak Point Project that will reduce impingement and entrainment and/or increase the survival rates of entrained and impinged organisms such that the overall adverse environmental impact from impingement and entrainment, even under higher flow rates necessary for once-through cooling, will be no greater than would result from adherence to the standard limits on volume and velocity.

The specific language suggested by EPA in the preamble to implement this variance, however, is seriously flawed in several respects.<FN 36> First, the proposed variance provision would authorize the permitting authority to impose alternative requirements provided that it determines that such alternative requirements "will minimize impingement and entrainment of aquatic organisms to a level commensurate with the requirements specified in § 125.84(a) -(e)." This formulation equates entrainment and impingement with adverse environmental impact, and effectively precludes the use of innovative technologies whose effect is to promote the survival of entrained or impinged organisms, rather than to reduce the number of organisms that are entrained or impinged in the first instance. EPA should revise this proposed variance provision to make clear that alternate requirements -in particular, higher flow rates and intake velocities -- may be approved where the permitting authority determines that overall adverse environmental effects from impingement and entrainment will be no greater than would result from strict adherence to the standard requirements.

EPA's suggested variance provision also would require that "the innovative design feature or method of operation has the potential for industry-wide operation."<FN 37> EPA articulates no basis for this

requirement, and there appears to be no adequate justification. It would be an unreasonable burden to require the facility seeking the variance to demonstrate that a technology that effectively minimizes adverse environmental impact in one waterbody, and given a particular plant configuration, would be equally effective in all other waterbodies or with all other possible plant configurations. Because each waterbody is a unique ecosystem, a given technology may be effective only in a small number of waterbodies. As long as the technology is effective in the particular waterbody and at the particular facility where it is proposed to be employed, it should qualify for a variance. The requirement for industry-wide applicability would needlessly undermine the usefulness of any variance provision and would discourage the development and use of innovative designs and operational methods for cooling water intake structures.

Footnotes

32 65 Fed. Reg., at 49119 (proposed Section 125.85(a)(2)).

33 It should be noted that EPA's description of the additional costs associated with dry cooling systems is not entirely accurate. EPA states that the additional "operating costs" for a dry-cooling system at the proposed Astoria Energy LLC project in Queens would be $19 million. Id.. at 49081 (col. 2). What EPA calls "operating expenses" are estimated annual lost revenues from reduced inefficiency. Assuming a 20-year project life, the total additional "operating" costs would be $380 million.

34 65 Fed. Reg. at 49092 (col. 3).

35 Id.. at 49092-93.

36 Id. at 49093 (col. 1).

37 Id. at 49093 (col. 1). It is assumed that EPA intended for the last clause of this provision to read "has the potential for industry-wide application."

EPA Response

In today's final rule, EPA has included an alternative requirements provision (40 CFR 125.85). See Section VII.H for further discussions. EPA believes that today's final rule, establishing technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure, would foster innovative technologies because it does not prescribe specific technologies that must be implemented. Although EPA has evaluated existing technologies and has taken their efficiencies into consideration, EPA supports the consideration of innovative technologies that will help facilities achieve the national standards set forth in today's final rule. See also response to comment 316bNFR.039.027 for brief discussion on the use of variances in other parts of CWA as they relate to today's final rule.

Comment ID 316bNFR.067.018

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Subject Matter Code 16.5

Request for Comment: Use of Innovative Technologies

EPA's suggested variance provision also is unduly narrow. A variance should be available under other circumstances where strict adherence to the national standards is not warranted. For example, the rules should allow for a variance from the proposed national standards when a facility can show that because of the characteristics of the waterbody (e.g., low aquatic productivity), increased flow and velocity rates would cause no greater adverse environmental impact than strict compliance with the standard flow and velocity rate requirements. The rules also should provide for a variance when it is determined by the permitting authority, in view of competing environmental considerations (such as air emissions, noise, and land and resource use), less stringent requirements would minimize the overall adverse environmental impact associated with the withdrawal of cooling water for the facility.

EPA Response

Although EPA has not allowed for a variance under these circumstances (see preamble section VII.H for further discussions on today's rule alternative requirements), EPA has established a Track II option which allows for the permit applicant to demonstrate, through site-specific studies, what technologies would work best in the specific conditions of the chosen site in order to comply with the requirements of this rule. For a discussion of how and why EPA has chosen what constitutes equivalent performance, see the preamble to the final rule. In short, EPA believes that as a technical matter, it is very difficult to compare across media for comparable environmental gain, and while EPA may consider this for existing facilities, EPA believes that the manner in which such a comparison would been done needs further study and consideration before including it in a final rule. See also response to comment 316b.039.027.

Comment ID 316bNFR.067.019

Author Name	Steven Smith
Organization	ABB Energy Ventures, Inc. & Oak Point Energy, LLC

Subject Matter Code 16.5

Request for Comment: Use of Innovative Technologies

EPA also should provide for a variance from the strict requirements for the SWBBC and follow-on monitoring for any facility that employs intake technology that provides alternate means for evaluating the effectiveness of measures to minimize adverse impact from entrainment and impingement, provided that the permitting authority determines that such alternate means will have a satisfactory level of reliability.

EPA Response

EPA disagrees. EPA believes that follow up monitoring to evaluate the efficiency and/or performance of the technology employed is essential to a technology-based national standard such as today's final rule. Today's final rule has not required pre-operational monitoring under Track I in order to assure a streamlined, certain permitting process, but is requiring that the technologies employed are evaluated. Under Track II, the study and evaluation previous to the implementation of the technology is essential to the site-specific nature of that approach, coupled with a post operational evaluation. EPA believes that no "satisfactory level of reliability", as stated by the commenter, can take place without the evaluation of the technologies employed.

Comment ID 316bNFR.067.020

Author Name	Steven Smith
Organization	ABB Energy Ventures, Inc. & Oak Point Energy, LLC

Subject Matter Code 5.2

Existing Facilities/Facilities Under Construction

[B]y excluding from the new rules only those facilities for which construction has commenced, EPA is effectively imposing a moratorium of 2-3 years or more on the permitting and construction of new power plants. This action is not without significant environmental and social costs, to which EPA appears to have given no consideration. For example, New York City, where the Oak Point Project would be located, has a peak electricity demand of 11,000 MW and that demand is growing by 300 MW per year. Much of the electricity consumed in New York City is produced by old and inefficient generating facilities that were built decades ago and that consume, on average, nearly one-third more fuel than a modem combined cycle plant to produce the same amount of electricity. In addition, the air emissions from these plants are substantially higher, per MW produced, than the emissions would be from a modem gas-fired plant using state of the art control technologies, such as the Oak Point Project. Oak Point's analysis of emission data collected by EPA indicates that the Project has the potential to result in significant reductions in emissions of SO2, NOx, CO2 and particulates, with an overall benefit of up to a 10 percent improvement in air quality for the local area. In addition, the Oak Point Project would enhance electric reliability in the Bronx by providing power directly to the local distribution system. These benefits will be substantially delayed, and possibly foregone altogether, if permitting of the Project is held hostage to the new Section 316(b) rules.

There is no compelling reason to apply the new rules as EPA has proposed. A more fair and efficient approach would be to exclude from the new rules any facility that has been designed, and for which a permit application has been determined by the permitting authority to be complete, prior to the effective date of the rule, provided that the applicant continues to pursue the application diligently. Such an approach poses no danger of a rush to file permit applications so as to avoid the requirements of the new rule. EPA need not announce this modification to the applicability provisions until the final rule is issued. At that point, it is unlikely that any potential applicant that was not already planning in good faith to submit a permit application could do so in the 60 to 90 days before the final rules likely would become effective, let alone secure a determination from the permitting authority that the application is complete. Under the Article X process in New York, for example, the Siting Board has 60 days just to determine whether an application is complete. <FN 4>

Nor is there any basis to fear undue adverse environmental impacts from projects that are permitted under the existing regulatory regime. The requirements of Section 316(b) are not presently being ignored; they are being duly applied on a site-specific basis to ensure that proper measures are taken to minimize adverse environmental impacts from cooling water intake structures. Indeed, recent permitting decisions in New York State reflect a particularly rigorous application of the requirements of Section 316(b). Under these circumstances, there is no basis in sound regulatory policy to apply the new rules in a way that will unduly burden, and possibly undermine altogether, projects for which the permit review process already is underway.

Footnotes

4 N.Y. PUB. SERV. LAW, Art. X, § 165.1

EPA Response

See response to comments 316bNFR.067.001 and 316bNFR.202.013.

Comment ID 316bNFR.067.088

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Steven Smith

Organization ABB Energy Ventures, Inc. & Oak Point Energy, LLC

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Terry M. Hogan & David E. Bailey

On Behalf Of:

Utility Water Act Group c/o Hunton & Williams

Author ID Number:

316bNFR.068

Note

Attachments received with 068 coded as 316bNFR.068, beginning with comment number 300 (Appendix E) and 400 (Appendix I).

Comment ID 316bNFR.068.001

Author Name Terry M. Hogan & David E. Bailey

Organization Utility Water Act Group c/o Hunton & Williams

Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

A Site-Specific Approach Is Needed

A site-specific approach to § 316(b) is essential. As we have said, sites for new electric generating units are hard to find. The problem with categorical, one-size-fits-all requirements for CWISs is that they will eliminate some sites that could accommodate a CWIS without harming the environment and promote the use of less environmentally desirable sites. Or they may require technology too costly to justify the benefits it would provide.

EPA's proposed § 316(b) rule is of the categorical sort, adopting an inflexible, one-size-fits-all approach. In effect, EPA has required cooling towers (or other closed-cycle systems) for every generating plant on an estuary or tidal river or within 50 meters of a "littoral zone" (as defined by EPA).

This broadscale requirement for a certain technology is unprecedented. It is somewhat like requiring a single control technology (clarifiers, for example) for facilities in a wide variety of industries discharging numerous pollutants, without closely analyzing the cost, energy requirements, or effectiveness at the actual facilities – something that EPA would never do when setting BAT guidelines under § 301. And in the case of CWISs, the requirement ignores another significant factor: fish, unlike pollutants in industry wastestreams, are not under the control of plant operators, and fish populations are subject to natural variations in abundance.

The potential for a CWIS to cause "adverse environmental impact" is inherently site-specific, and so are the technological alternatives for addressing the impact. Facilities that use cooling water will be sited on different types of waterbodies, each with its own physical characteristics (flow, substrate, shoreline) and its own variety of plants and animals. Similar facilities on the same reach of a river can have different impacts, depending on how the intake is designed and where it is placed in relation to where the fish breed and how they behave. See Wisniewski, J. 1999 (1998-99 EPRI Workshops), Power Plants & Aquatic Resources: Issues and Assessments. D. A. Dixon, D. E. Bailey, C. Jordan, J. R. Wright, Jr., and K. D. Zammit (guest eds.), J. Envtl. Sci. & Pol'y Vol. 3. EPRI 1000767.

Likewise the feasibility, effectiveness, and cost of technologies to reduce CWIS impacts vary from site to site. Some technologies (barrier nets, for example) cannot be used where there are strong currents, ice, or floating debris. See Electric Power Research Institute, Fish Protection at Cooling Water Intakes (EPRI Technology Review) (TR-114013 December 1999), pp. 2-21 to 2-22. Land requirements for cooling system technologies, like recirculating towers, preclude their use at smaller sites (e.g., barge-mounted power plants). EPA has long recognized the site-specific features that affect § 316(b) decisions, as shown by EPA's 1976 § 316(b) rules, its 1977 draft guidance for implementing § 316(b), and many site-specific § 316(b) case decisions, discussed below.

What is needed, therefore, is a scientifically sound site-specific approach that takes account of the

complexity of aquatic communities and the local specifics of the substrate, bank, vegetation, depth, and flow at specific sites, along with technological feasibility, cost, and impacts on other environmental media (air, noise, and solid waste).

Unfortunately, the proposed rule moves away from site-specific determinations in favor of a generic, minimum technology decision based on a small subset of the relevant factors (waterbody category, water volume, intake velocity, and littoral zone). For example, EPA treats as "most sensitive" all estuaries and tidal rivers and the entire "littoral zones" of other waterbodies. All CWISs to be placed in such areas would have to meet stringent uniform and redundant standards. As EPA recognizes, this is a major departure from how § 316(b) has been implemented, through guidance, in the 28 years since it was enacted. It ignores the many biological, operational, and locational factors that affect CWIS impacts. See Parts VII – IX below and Appendix C to these comments. The way in which EPA has set the minimum performance standards (for instance, requiring that cooling water flows reflect reductions achievable by a wet recirculating cooling system) would preclude new facilities from using other proven CWIS technologies, such as wedge-wire screens, which have been demonstrated to achieve benefits comparable to closed-cycle cooling at much lower cost. Similarly, EPA's proposed velocity limit of 0.5 feet per second (fps) could preclude angled screens that use high channel versus normal velocity differences to reduce impingement. See EPRI Technology Review.

In short, EPA's rules should, consistent with its past approach, embrace the principle of site-specific decisionmaking. This approach should be an option, an alternative to the quicker and easier (though possibly more expensive) option of simply installing pre-approved technology.

EPA Response

The final two-track approach addresses these points. It balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, by allowing a new facility to demonstrate performance comparable to that which would be achieved in Track I through other means under Track II.

Comment ID 316bNFR.068.002

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Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

While EPA's proposed rule mentions a variety of alternatives, it fails to adequately evaluate any of them. The rulemaking record lacks crucial information such as:

*An assessment of experience with intake technologies in use by existing facilities;
*A full assessment of the costs and benefits of the proposed rule, including environmental, energy, and economic costs and benefits; and
*An assessment of the costs and benefits, including environmental, energy, and economic costs and benefits, of alternatives to the proposed rule.

EPA Response

EPA's record fully considers available data on technologies that can be used to address the location, design, construction and capacity of cooling water intake structures. EPA has reviewed hundreds of documents and papers that contain information on the design and efficacy of cooling water intake structure technologies. Documents which summarized EPA's knowledge were developed and placed in to the record. (For example, see Preliminary Regulatory Development Section 316 (b) of the Clean Water Act —— Background Paper Number 3: Cooling Water Intake Technologies and Supplement to Background Paper 3: Cooling Water Intake Technologies in Docket #1-5069-PR and #1-5070-PR). In addition to the numerous documents that have been placed in the docket, EPA developed documentation that summarizes available information on the efficacy of technologies (see the Technical Development Document). The final rule record includes additional analyses of the costs and benefits of the rule, including assessments of major alternatives considered, and broader environmental and energy assessments.

Comment ID 316bNFR.068.003

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Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

Although EPA's proposal discusses, mostly with anecdotal information, the benefits <FN3> of closed-cycle cooling (see, e.g., 65 Fed. Reg. 49,072-73), it does not address other environmental trade-offs, some of them substantial. See Part IX.B.1.b below. Moreover, the Agency does not give a thorough assessment of the performance and environmental benefits of closed-cycle cooling and other technologies on which the proposed requirements are based. Without a better assessment of all environmental costs and benefits, there is no way to tell whether the rule succeeds in improving environmental protection overall.

Footnotes

The Economic and Engineering Analyses (EEA) prepared by EPA's consultants to support the rule note that "data and time constraints" prevented EPA from doing a full benefits analysis. EEA at 11-22.

EPA Response

For a discussion of the side effects of closed-cycle cooling, see response the preamble to the final rule, Chapter 3 of the Technical Development Document and responses to comments 316bNFR.068.100 and 316bNFR.068.332.

For a discussion of the environmental benefits of flow reduction (and therefore, entrainment reduction) of closed-cycle cooling see the preamble for the final rule and the economic analysis.

Comment ID 316bNFR.068.004

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

EPA does not explain how the scientific references it cites support its definition of the "littoral zone," which in turn defines ecological sensitivity and productivity, nor does it attempt to compare effects inside and outside the littoral zone. While the record for the rulemaking lists some 784 pages of documents relating to "BTA – location," this designation is too broad to enable commenters to critique EPA's littoral zone approach. Nowhere does EPA comprehensively analyze the scientific literature or explain how it supports EPA's concept of the littoral zone.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.068.005

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Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

As part of its applicability criteria, EPA has decided that facilities using 25 percent or more of the water withdrawn for cooling purposes are subject to the rule. EPA's sole rationale for this choice is the extent to which it will ensure that "almost all" cooling water withdrawals will be regulated. EPA does not explain why this is a desirable goal, or one contemplated by the statute.

EPA Response

In regulating cooling water intake structures EPA must determine the most appropriate regulatory framework under which to meet the goals of the statute. EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.068.006

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Subject Matter Code 12.1

Freshwater Streams/Rivers

EPA provides no reference to the record for its choices of design intake flow rates for intakes in freshwater streams and rivers.

EPA Response

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities.

Comment ID 316bNFR.068.007

Subject Matter Code	2.2
Obligation Under 316(b)	

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Section 316(b)'s Place in the Clean Water Act Reveals Its Meaning

Although (as explained below) there is little legislative history of § 316(b), something can be learned of Congress' intent from the structure of the Clean Water Act and the placement of § 316(b) among other related sections.

In the first place, § 316(b) refers to §§ 301 and 306 but is not combined with either of them, or with §304, the companion to § 301. Instead, § 316(b) stands with § 316(a) as a separate section, suggesting that Congress did not view it as just another purely technology-based standard-setting requirement. Instead, its placement suggests that Congress recognized that it could provide a mechanism for case-by-case, site-specific decisionmaking on both the front and back ends of cooling water uses. As noted below, the legislative history supports this idea.

In the second place, § 316(b) is distinct from the other technology-based provisions of the Act because the goal of the technology determination under § 316(b) is to achieve a desired condition in the environment-at-large (minimizing "adverse environmental impact") rather than to reduce "pollutants" added by the discharger. As its approach to setting and implementing other water protection goals (such as water quality standards under § 303(c)) shows, Congress understood that water resources and desired environmental endpoints for those waters were heterogeneous, calling for site-specific consideration. At the same time, questions of technical feasibility and cost are also relevant. In that sense, § 316(b) is much more like § 302, which is applied case-by-case. Section 302 authorizes federal effluent limitations to be set whenever EPA identifies a "specific portion of the navigable waters" where point source discharges would interfere with water quality. As does § 302, §316(b) appears to call for site-specific decisions.

In the third place, § 316(b) does not refer to minimization of "entrainment and impingement effects" or "intake effects" or even "effects on aquatic resources," but of adverse environmental impacts. This indicates that Congress took a broad view, realizing that alternative intake structures could have environmental impacts that would need to be balanced against their benefits.

In the fourth place, § 316(b) does not require elimination of AEI, which might not be achievable for technical or cost reasons in some cases.

Finally, § 316(b) applies only to intake structures for cooling water, leaving intakes for process water unregulated. It is hard to believe that Congress intended to single out cooling water users for uniquely stringent regulation, at the same time leaving other intakes entirely unregulated.

EPA Response

Introduction

EPA agrees that the language of section 316(b) could be interpreted to allow for site-specific decision making. At the same time, EPA believes that the language of section 316(b) can also be reasonably interpreted to allow EPA authority to take a primarily technology-based approach to establish national requirements for new facilities where the record supports a determination that the technology basis for such requirements is technically available, economically practicable, and where EPA has considered the other environmental impacts of the requirements, such as energy impacts. (EPA also believes that the statute also gives EPA authority to establish flexibility in the rule to allow other technologies suites that comparably reduce impingement mortality and entrainment to meet the rule's requirements.)

Section 316(b) of the CWA states:

Any standard established pursuant to section 1311 of this title or section 1316 of this title an applicable to a point source shall require that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

The degree of deference afforded to an agency in interpreting a statute it is responsible to administer was articulated by the Supreme Court in Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 838, 843 (1984). There, the Supreme Court stated:

When a Court reviews an agency's construction of the statute which it administers, it is confronted with two questions. First, as always, is the question whether Congress has directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress. If, however, the court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute, as would be necessary in the absence of administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute." . . . fn "The court need not conclude that the agency construction was the only one it permissibly could have adopted to uphold the construction, or even the reading the court would have reached if the question initially had arisen in a judicial proceeding. Thus, if a statute is ambiguous and an agency's interpretation of the statute is reasonable, a court must defer to the agency even if, in the court's view, the agency is wrong."

See also Amax Land Company v. Quarterman, 181 F.3d 1356, 1365 (D.C. Cir. 1999) where the D.C. Circuit recently reviewed an agency's change of interpretation and found that a changed interpretation would not defeat Chevron deference, . . . but would under Motor Vehicle Mfrs. Ass'n of United States, Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 46-57, require the agency to provide a reasoned explanation for its changed interpretation, see Smiley v. Citibank, N.A. 517 U.S. 735, 742 (1996). See also, Christensen v. Harris County, 529 U.S. 576, 587 (2000), Piney Run v. Commrs of Carroll County, ____ F.3d _____ (4th Cir 2001) 2001 WL 1193211 (applying Chevron deference where the agency's interpretation was issued pursuant to a formal adjudication or notice and comment rulemaking.)

Under a Chevron analysis, step 1 could apply because the plain language clearly states that EPA is to use a technology-based approach. However, because the statute also contains the phrase "for minimizing adverse environmental impact" a court may find that the statute is ambiguous in terms of what approach may be used for regulating under CWA section 316(b).

EPA disagrees with the commenter that the statute compels a site-specific approach. Instead, EPA believes that the language of section 316(b) permits a primarily technology-based approach and that such an approach is appropriate for new facilities. While EPA section 316(b) is separate from sections 301 and 306, EPA notes that Congress used almost the exact same phrase "best technology available" in 316(b) as it used in section 301(b)(2)(A) "best available technology economically achievable" and section 306(a)(1) "best available demonstrated control technology." EPA believes it is reasonable to interpret section 316(b) of the CWA to permit it establish a primarily technology-based requirement relating to the location, design, construction and capacity for cooling water intake structures. C.I.R. v. Keystone Consol. Industries, Inc., 508 U.S. 152,124 (1993)(It is a normal rule of statutory construction that identical words uses in different parts of the same act are intended to have the same meaning.) Gustafson v. Alloyd Co., Inc., 513 U.S. 561 (1995)(same). Further, the words location, design, construction and capacity contemplate technology-based requirements.

Further, the cross reference to section 301 and 306, particularly section 306 for new sources, makes it reasonable for EPA to approach 316(b) requirements for new facilities in the same manner as those requirements, which are clearly technology-based.

(1) EPA disagrees that section 316(b)'s placement in a separate section of the statute from section 301 and 306 precludes EPA from adopting a primarily technology-based approach. Instead, EPA believes it is reasonable to interpret section 316(b) as having been placed in a distinct section because it addressed a distinct environmental impact - the impact from the withdrawal of waters from waters of the United States. Section 316(b) is the only section of the CWA that addresses regulatory control for such water withdrawals. This is distinguishable from section 301 entitled "effluent limitations" and section 316(a) entitled "Effluent limitations that will assure protection and propagation of balanced, indigenous population of shellfish, fish and wildlife." Section 502(11) of the CWA defines "effluent limitations" as "any restriction . . .on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance." (Emphasis added.) This distinct environmental problem, withdrawal from waters of the U.S., as contrasted with the focus of these other sections -- discharge to waters of the U.S. – is reflected in the legislative history (See Legislative History of the Water Pollution Control Act Amendments of 1972, 93rd Cong., 1st Sess., at 196-198 (1973)(colloquy between Senator Muskie and Senator Buckley in which Mr. Buckley cites several newspaper articles including one from the New York Times, dated October 4, 1972, where AEC has required wet cooling in order to deal with, among other things, impingement and entrainment caused by once through cooling "once through cooling systems . . . suck . . water from the river . . . and the Fisherman's Association said this would kill much of the river's fish by heating and battering them." In the colloquy, Senator Buckley is concerned that this legislation will preclude the Atomic Energy Commission from regulating more stringently than EPA . Senator Muskie states in reply, "We considered that this kind of authority should be in EPA and not in AEC, and in order to put the authority there, we put it in this act, and not in AEC, and that is where it is.").

Although the commenter makes much of the fact that section 316(b) is separate from sections 301 and 306, EPA notes that Congress did not place the provisions of 316(b) in either section of the statute focused on water-quality provisions, i.e., section 303 which relates to state ambient water-quality standards or section 302 which relates to federal promulgation of water quality based effluent limitations.

(2) EPA disagrees with the commenter that the phrase "minimizing adverse environmental impact" precludes a primarily technology-based approach and compels a site-specific approach. As the comment points out, this section of the statute deals with a different environmental problem, water intake, than sections 301 and 306, which deal with discharges of pollutants, and that difference is a reasonable interpretation of why the CWA uses different terms in section 316(b) that in sections 301 and 306. See also House consideration of the Conference Report where section 316(b) is described as requiring "the location, design construction, and capacity of cooling water intake structures . . .reflect the best technology available for minimizing any adverse environmental impact. The reference here to 'best technology available' is intended to be interpreted to mean the best technology available commercially at an economically practicable cost." (Emphasis added.) 118 CONG. REC 33, 762 (1972), reprinted in 1 Legislative History of the Water Pollution Control Act Amendments of 1972, 93rd Congress., 1st Sess., at 264 (1973). Here, for new facilities, EPA's record supports that the requirements are economically practicable, technically available, and economically achievable for the industries affected as a whole. In such an instance, EPA believes it may establish such requirements to minimize impingement and entrainment and that it is not required to approach requirements for new facilities on a case-by-case basis.
EPA disagrees that section 316(b) is more like section 302 of the CWA than the other technology-based provisions of the act because the language of 316(b) is distinguishable from the language of section 301(b)(1)(c), section 302(a), section 303(c)(2)(B), and section 316(a), all of which are water quality-based:

•Section 301(b)(1)(C) relates to effluent limitations "necessary to meet water quality standards."
•Section 302(a) authorizes EPA to promulgate federal effluent limitations where discharges "would interfere with the attainment or maintenance of that water quality in a specific portion of the navigable waters which shall assure protection of public health, public water supplies, agricultural and industrial water uses, and the propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water."
•Section 303(c)(2)(B) provides that EPA must promulgate federal ambient water quality standards for toxic pollutants where EPA has published national criteria recommendations for such pollutants and where "the discharge or presence [of such pollutants] in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State . . ." (Because states have in complied with section 303(c)(2)(B) and because states must issue effluent limitations that are necessary to meet water quality standards, EPA has not generally had any reason to take action under section 302.)
•Section 316(a) relates to thermal discharges and provides that where a "discharger shows that effluent limitations for heat are more stringent than necessary to assure the projection [sic] and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the water into which the discharge is to be made, the Administrator . . . may impose an effluent limitation under such sections for such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and

propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the water." •Section 303(d) of the CWA requires total maximum daily thermal loads "to assure protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife. Such estimates shall take into account the normal water temperature, flow rates, seasonal variations, existing sources of heat input, and the dissipative capacity of the identified waters or parts thereof."

Thus, because the language of section 316(b) does not talk about water quality standards, water quality or balanced indigenous populations, but rather "best technology available for minimizing adverse environmental impact," it is reasonable for EPA to interpret the statute to authorize it to take a different approach in implementing section 316(b) than it takes in those other sections. Bates v. U.S., 522 U.S. 23, 29-30 (1997).(Where Congress includes particular language in one section of a statute, but omits it in another section of the same act, it is generally presumed that Congress acted intentionally and purposely in the disparate inclusion or exclusion.) See also Florida Public Telecommunications Ass'n, Inc. v. F.C.C., 54 F.3d 857 (D.C. Cir. 1995) (Where Congress uses different language in different sections of a statute, it does so intentionally. U.S. v. Barial, 31 F.3d 216 (4th Cir. 1994)(If Congress has chosen different language in proximate subsections of the same statute, then reviewing courts are obligated to give effect to that choice.) EPA has a longstanding view that section 316(b) may address environmental endpoints differently that does section 316(a). See In re Brunswick Steam Electric Plant, Decision of the General Counsel No. 41 (June 1, 1976). Thus, it is reasonable to view the two different sections of the statute as addressing different environmental problems in different ways and to allow EPA to establish controls under section 316(b) on a different basis than controls established under 301, 304, and 306 as modified under section 316(a).

(3) Next, EPA disagrees that the phrase "adverse environmental impact" precludes EPA from minimizing impingement and entrainment. As stated in the preamble to the final rule, EPA finds it reasonable to interpret the phrase adverse environmental impacts as including a range of impacts, including impingement and entrainment, diminishment of compensatory reserve, stresses to the population or ecosystem, harm to threatened or endangered species, impairment of state water quality standards, see section V of the preamble to the final rule. See also legislative history cited above regarding the phrase "any environmental impact." EPA notes that other statutes define the term "adverse" broadly in a manner that includes a range of impacts. For example, under the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 et seq., which requires federal agencies to consult with the Secretary of Commerce on any actions that may adversely affect essential fish habitat, the regulations implementing the statute define "adverse effect" as "any impact which reduces quality and/or quantity of EFH. Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions." 50 C.F.R. § 600.910(a).

Further, in response to the third comment, EPA believes that it is reasonable and appropriate, if not compelled by the words of section 316(b), to consider the other environmental effects of the requirements it establishes. EPA has taken into account such effects in this rulemaking.

(4) In response to the fourth comment, EPA agrees that the statute does not require elimination of adverse environmental impact, but instead, uses the phrase "minimizing" adverse environmental

impact.

(5) With respect to the statute's focus on cooling water, EPA recognizes that the statute addresses cooling water intakes and not other intakes. EPA does not believe that this undermines EPA's authority to regulate flow into cooling water intake structures as a regulation of "capacity" and/or "location." EPA notes that section 316(b)'s focus on intake is unique.

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Subject Matter Code 2.2

Obligation Under 316(b)

Section 316(b) Is No More Stringent Than § 316(a)

As we show below, § 316(b) is inextricably linked to § 316(a) in the legislative history of the Clean Water Act. Section 316(a) allows facilities to demonstrate that they are entitled to a variance from thermal water quality standards if the applicable standards are "more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made." EPA claims that Congress intended, in § 316(b), to set a higher standard of environmental protection than § 316(a):

The Agency has long maintained that adverse environmental impact from cooling water intake structures must be minimized to the fullest extent practicable, even in cases where it can be demonstrated that the standard applicable under section 316(a) is being met. Thus the objective of section 316(b) is more protective than that of 316(a). However, EPA also requests comment on adapting the section 316(a) standard for purposes of section 316(b) and defining adverse environmental impact as impacts likely to interfere with the protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife.

65 Fed. Reg. 49,075 col. 2-3 (citing Decision of the General Counsel No. 41 In re Brunswick Steam Electric Plant (June 1, 1976); In re Public Service Co. of New Hampshire (Seabrook Station Units 1 and 2) (Decision of the Administrator), 10 Env't Rep. Cas. (BNA) 1257, 1262 (June 17, 1977); and Decision of the General Counsel No. 63, In re Central Hudson Gas and Electric Corp. (July 29, 1977).

As support, EPA cites two General Counsel opinions and a decision of the Administrator which say that § 316(a) and (b) establish different tests and that AEI must be minimized even if a BIP already exists:

Section 316(a) thus permits an adverse environmental impact so long as the impact does not interfere with the protection and propagation of the balanced indigenous population . . . . Any adverse environmental impact must be minimized under Section 316(b).

OGC Decision No. 63 (July 29, 1977), citing OGC Decision No. 41 at 12.

EPA's analysis amounts to an argument that Congress believed that a "balanced, indigenous population" was synonymous with some "adverse environmental impact." But this interpretation is unsupported and seems inconsistent with the way that the "balanced indigenous population" or "BIP" test is used in other parts of the statute. Specifically, in § 101(a)(2) Congress included the "balanced, indigenous population" standard among the central goals of the Act, to be met wherever attainable. Congress also required, in § 303(g) <FN4>, that states conform their thermal water quality standards to the BIP standard. It is hard to believe that Congress prescribed a nationwide goal for water quality standards so weak that it would allow "adverse environmental impact" to occur.

As support for EPA's interpretation, General Counsel Opinion 41 notes that Congress could have used the same standard explicitly in both §§ 316(a) and (b). But, as the legislative history discussed below demonstrates, Congress clearly intended § 316(b) to require only measures that are economically practicable and "available." Congress could not have been confident that there existed technology that would ensure a BIP. Hence, it would not have required technology to accomplish something – BIP – that might be impossible to achieve.

Equally telling is the fact that none of the internal agency interpretations that EPA cites offers any clear explanation of what does constitute "adverse environmental impact." To the extent they speak to the question at all, they suggest that AEI involves impacts that are "significant" at the population level or that would disrupt aquatic communities.<FN5>

Also, § 316(c), which applies to thermal discharges, provides that effluent limitations that ensure the protection and propagation of a balanced, indigenous population will not be subject to more stringent limitations with respect to the thermal component of the discharge during a ten-year period. 33 U.S.C. § 1326(c). It thus appears that Congress was concerned enough about the burden that the §316(a) BIP standard might impose to protect dischargers for ten years from more stringent requirements. It would be irrational to impose an even more stringent requirement in § 316(b) and yet not provide a ten-year grace period for that as well. Evidently Congress did not regard § 316(b) as more stringent than § 316(a).

In short, UWAG does not believe that EPA's previous analysis of this issue is credible, and we urge EPA to reconsider it. While a § 316(a) determination may not be determinative with respect to §316(b), we submit that the concept of § 316(a) – i.e., that anthropogenic effects are not "adverse" if they do not result in significant disruptions at the population level or some higher level of biological organization – are essential to proper interpretation and implementation of § 316(b) as well.

Footnotes

4 Section 303(g) provides that "[w]ater quality standards relating to heat shall be consistent with the requirements of section [316] of this title."

5 OGC Decision No. 63, in particular, addressed timing. It provides no independent analyses of the relative stringency of § 316(a) versus § 316(b).

EPA Response

As stated in response to comment 316bNFR.068.007, EPA believes that section 316(b) does not compel EPA to find the phrase best technology available for minimizing adverse environmental impact" to compel a water-quality based approach, but rather EPA believes it is reasonable to interpret the phrase to authorize EPA to take a primarily approach to the final new facility rule. EPA believes that it is reasonable to interpret the use of the unique phrase "adverse environmental impact" in 316(b) to refer to a unique environmental issue - intake of water, rather than the issue the bulk of rest of the statute addresses, discharges of water. EPA discusses its interpretation of the many types of effects are adverse environmental impacts in the preamble to the final rule. (This is supported by the legislative history quoted above in response to comment 316bNFR.068.007 regarding "any" adverse environmental impact.) In this sense, an adverse environmental impact could be something less significant than an impact that is demonstrated to affect a balanced indigenous population.

Contrary to the commenter's interpretation of the statute, "that Congress clearly intended § 316(b) to require only measures that are economically practicable and 'available.' Congress could not have been confident that there existed technology that would ensure a BIP. Hence, it would not have required technology to accomplish something – BIP – that might be impossible to achieve" EPA disagrees that its interpretation of the statute is unreasonable. Instead, EPA interprets the section 316(b) as follows: unlike section 316(a), which clearly authorizes a relaxation from otherwise applicable technology-based standards for discharges of heat, if a balanced indigenous population is protected, Congress did not include such a provision in section 316(b), and therefore it is reasonable for EPA not to use the same endpoint in section 316(a)("balanced indigenous population") as it does under section 316(b) for new facilities.

EPA interprets section 316(b) in the overall context of the CWA. In general, there are two types of controls under the CWA, technology-based controls (which in general apply to discharges of pollutants from point sources) which have various levels of technical and cost considerations depending on the type of control (BPT, BAT, BCT, NSPS/ CWA sections 301, 304, 306) and where those controls are not sufficient to meet water quality standards, additional controls necessary to meet water quality standards CWA section 301(b)(1)(C). Arkansas v. Oklahoma, 503 U.S. 91, 101 (1992). EPA v. California ex rel. State Water Res. Control Bd., 426 U.S. 200, 205, n. 12 (1976). Although the commenter asserts that Congress must not have used the phrase "balanced indigenous population" in section 316(a) because it might not have been economically practicable to achieve, EPA finds it more reasonable to interpret that Congress understood that technology controls (under 301 and 306) would apply to discharges of heat under 316(a) and withdrawals of water under 316(b), but that Congress expressly provided a relaxation of these requirements for heat due to the unique site specific nature of the effects of heat in that it dissipates differently in different locations. See House Consideration of the Conference Report, Statement of Mr. Clausen 1 Legislative History of the Water Pollution Control Act Amendments of 1972, 93rd Congress., 1st Sess., at 264 (1973)("The managers on the part of the House were firm in their deliberations in conference with the other body and were successful in having section 316(a) of the conference report contain a clear recognition of the dissipative capacity of the receiving waters for the control of waste heat. Section 316(a) modifies the requirements of both sections 301 and 306 as they pertain to the thermal components of discharges from point sources. ");Mr. Johnson, 1 Legislative History of the Water Pollution Control Act Amendments of 1972, 93rd Congress., 1st Sess., at 267 (1973). ("This agreement recognizes that heat is different from solid or suspended pollutants because of its temporary and localized nature, and permits consideration of the dissipating capacities of the receiving waters, on a case-by-case basis.") Statement of Mr. Clark, Id at 273-272. As Congress did not provide any such relaxation provision in section 316(b), EPA interprets section 316(b) as authorizing EPA to take a primarily technology-based approach in this rule. For new facilities, EPA has found the requirements to be technically available (many of the requirements reflect current practice for new facilities) and economically practicable, and that it is reasonable not to provide relaxation of the otherwise applicable technology standards as appears in section 316(a). Such an approach provides certainty and quicker action than would occur if EPA were to adopt a case-by-case or population approach for new facilities. EPA finds it reasonable to interpret the unique phrase "adverse environmental impact" to be used because section 316(b) addresses a unique environmental issue, withdrawal of water for cooling purposes. See Response to Comment 316bNFR 068.007. With respect to EPA's interpretation of adverse environmental impact, EPA addresses this in the preamble to the final rule.

With respect to section 316(c)'s granting of a grace period for thermal discharges, this does not compel EPA to regulate withdrawal of water "less stringently" under section 316(b) than it does under section 316(a). (EPA takes issue with the phrase "less stringent" Instead, EPA simply believes that section 316(b) provides EPA authority to use a primarily technology-based approach rather than a population–based approach.) In fact, the lack of a grace period for water withdrawals in section 316(b) could arguably suggest that Congress wanted EPA to regulate water withdrawals more "stringently" than it regulates thermal discharges. More than whether one type of regulation was to be more stringent or less stringent, EPA believes because the language of section 316(b) is very close to the technology-based language in sections 301, 304 and 306 and section 316(b) states that when establishing standards under sections 301 and 306, EPA shall require best available technology for minimizing adverse environmental impact, it is appropriate for EPA as an effort ancillary to its technology-based effluent limitations guidelines and standards to establish technology-based requirements on cooling water withdrawals. See Response to Comment 316bNFR.068.007.

Comment ID 316bNFR.068.009

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Subject Matter Code 2.2

Obligation Under 316(b)

The History of §316(b) Compels a Site-Specific Approach

There is little legislative history <FN6> of § 316(b), but what there is shows two things. First, Congress intended that thermal discharges be regulated case-by-case and authorized the same approach for cooling water intake structures. Second, "BTA" means best technology "available commercially at an economically practicable cost,"<FN7> which means that any required CWIS technology must be "best available" and its cost economically "practicable."

Section 316(b) was a compromise between Senate Bill 2770 and House Bill 11,896, developing out of a debate over thermal discharges and methods of controlling them. The House Bill originally provided for a consideration of alternative technologies for thermal discharges:

The regulations shall require any person proposing to make such a discharge to consider all alternative methods for controlling such a discharge, including, but not limited to (1) utilization of available water bodies or cooling devices, including once-through cooling, mixing zones, cooling ponds, spray ponds, evaporative or non-evaporative cooling towers, (2) dilution of heated waters with cooler waters, and (3) an alteration of the outlet configuration. <FN 8>

It also provided that, in choosing alternative control methods, decisionmakers would consider engineering and technical feasibility, social and economic costs and benefits, environmental impact (including air quality, land use, and natural resources), and methods to minimize adverse effects and maximize beneficial effects of discharges.<FN 9>

Thus, the original House approach to thermal discharges was a process for considering technologies site-by-site. The interest in national uniformity served by effluent limitations guidelines and new source performance standards (NSPS) for other pollutants was thought not to apply to heat. <FN 10> Also, Congress recognized that the electric generating industry was not able to concentrate in "pollution havens" and that the small number of major thermal discharges made site-specific regulation feasible.

Moreover, it had been "persuasively shown during the hearings . . . that the appropriate type and level of control over thermal discharges varies substantially among different waters and regions of the country." <FN 11> Thus the Committee on Public Works concluded that regulations should be developed and the costs and benefits evaluated for thermal discharges on a case-by-case basis. <FN 12>

The Senate Bill took a different approach and would have regulated heat just like other pollutants. There was no separate provision for thermal discharges.

Neither House nor Senate bill included language like the present § 316(b) or addressed CWISs.

Likewise, the legislative history contains much discussion of heat but no mention of CWISs.

This is not to say, however, that Congress gave no guidance, because the key to the meaning of §316(b) can be derived both from § 316(a) as it finally emerged and from its predecessors, the competing provisions for thermal discharges in the two bills. It is clear from both bills and from the final statute that Congress decided to regulate discharges of heat differently from other pollutants. For most pollutants, Congress relied on the new uniform technology-based effluent limitations and performance standards, regardless of site-specific water quality. In contrast, § 316(a) allowed variances from the technological requirements for heat based on environmental conditions at particular sites. This case-by-case approach recognized the unusual market structure of the steam electric utility industry (the largest user of cooling water), the tendency of heat to dissipate in the environment, and the fact that sometimes heat is beneficial. The House bill took account of extensive testimony before the House Committee on Public Works about the unique characteristics of heat as a pollutant and the high costs of closed-cycle cooling, especially when compared to the limited environmental benefits. <FN 13>

The Senate Committee on Public Works also heard testimony distinguishing heat from other pollutants. Despite repeated statements about the need to regulate thermal discharges on a case-by-case basis, however,<FN 14> the Senate Committee decided to treat discharges of heat like any other pollutant. It simply defined "pollutant" to include heat and made discharges of heat subject to the same national uniform effluent limitations and standards of performance as other pollutants.

The compromise achieved by the Conference Report adopted the Senate approach by defining "pollutant" to include heat and by regulating thermal discharges with the effluent limitations and standards of performance used for other pollutants. But in § 316(a), the compromise reflected the House Bill by allowing point sources to obtain case-by-case variances based on the "balanced, indigenous population" standard.<FN 15> This was intended to balance the effects of heat with the economic impacts of control technologies <FN 16> and to recognize the need to regulate heat on a case-by-case basis.

For example, a House Floor Manager said that the final bill "recognizes that heat is different from solid or suspended pollutants because of its temporary and localized nature, and permits consideration of the dissipating capacities of the receiving waters, on a case-by-case basis." <FN 17> As the Floor Manager of the Conference Report in the House said, "the problems of enforcement including the identification of violators, the apportioning of load limits for a given body of water, and the determination of the effects of a given source are all less difficult than the problems encountered in the case of the multitude of sources of the various other pollutants." <FN 18>

Next to this compromise on heat in § 316(a), § 316(b) appeared without explanation in the Conference Report <FN 19>, which does no more than quote § 316(b)<FN 20>. Neither the Conference Report nor the subsequent hearings offer much discussion of § 316(b). And virtually no mention of CWISs appears in the record compiled by the House Committee on Public Works.<FN 21>

Nevertheless, the timing and placement of § 316(b) suggest that Congress regarded it as different from other purely technology-based requirements and intended it to be applied so as to take into account site-specific environmental impacts. Part of the rationale for case-by-case regulation of heat

– that the nature of electric power generating stations permits easy identification and enforcement – applies to § 316(b) as well.

Footnotes

6 Much of the information in this part about the legislative history of § 316 comes from W. Anderson, II, Taken In Over Intake Structures? Section 316(b) of the Clean Water Act, ___ Colum. J. Envtl. L. ____ (2000) (in press).

7 118 Cong. Rec. 33,762 (1972), reprinted in Senate Comm. on Pub. Works, 93rd Cong., 1st Sess., A Legislative History of the Water Pollution Control Act Amendments of 1972 (1973) (hereinafter Leg. Hist.) at 264 (statement of Representative Don H. Clausen).

8 H.R. 11,896, reprinted in Leg. Hist. at 1043-44.

9 H.R. 11,896 at § 316(b), Leg. Hist. 1043-44.

10 118 Cong. Rec. 33,761 (1972), reprinted in Leg. Hist. at 263 (statement of Representative Don H. Clausen).

11 118 Cong. Rec. 33,761 (1972), reprinted in Leg. Hist. at 263.

12 See H.R. Rep. No. 911, 92nd Cong., 2nd Sess. 120, reprinted in Leg. Hist. at 807.

13 Water Pollution Control Legislation, 1971 (Oversight of Existing Programs): Hearings Before the Committee on Public Works, House of Representatives, 92nd Cong., 1st Sess. (1971) at 688; Water Pollution Control Legislation, 1971 (Proposed Amendments to Existing Legislation): Hearings Before the Committee on Public Works, House of Representatives, 92nd Cong., 1st Sess. (1971) at 1216, 1236, 1313, 1317, 1329, 2316; Water Pollution Control Legislation, 1971: Hearings on H.R. 11896, H.R. 11895 Before the Committee on Public Works, House of Representatives, 92nd Cong., 1st Sess. (1971) at 244, 773, 775-76, 875, 916; see generally Environmental Effects of Producing Electric Power: Hearings Before the Joint Committee on Atomic Energy, Part I, 91st Cong., 1st Sess. 1 (1969) (hereinafter Joint Committee Part I) at 12, 269, 335-36; Environmental Effects of Producing Electric Power: Hearings Before the Joint Committee on Atomic Energy, Part II (Vol. I), 91st Cong., 2nd Sess. (1970) (hereinafter Joint Committee Part II (Vol. I)) at 1446, 1519, 1564-65, 1646-47, 1804, 1818-19, 1823, 1831-32, 1854-55; Selected Materials on Environmental Effects of Producing Electric Power: Joint Committee on Atomic Energy, 91st Cong., 1st Sess. (1969) (hereinafter Joint Committee Selected Materials) at 28, 30, 70, 172, 200, 289, 301.

14 Water Pollution Control Legislation, Waste Water Treatment Technology (Part 8): Hearings Before the Subcommittee on Air and Water Pollution of the Committee on Public Works, United States Senate, 92nd Cong., 1st Sess. (1971) at 4112, 4114, 4116-20, 4130-31, 4134-35; see generally Joint Committee Part I at 11; Joint Committee Part II (Vol. I) at 1603, 1783; Environmental Effects of Producing Electric Power: Hearings Before the Joint Committee on Atomic Energy, Part II (Vol. II), 91st Cong., 2nd Sess. (1970) (hereinafter Joint Committee Part II (Vol. II)) at 2463, 2466.

15 Section 316(a) of the Clean Water Act provides, in pertinent part:

whenever the owner or operator of any [point source subject to §§ 301 or 306 of the Act] . . . can demonstrate to the satisfaction of the Administrator . . . that any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than necessary to assure the projection [sic] and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made, the Administrator . . . may impose an effluent limitation under such sections for such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water.

16 Leg. Hist. at 267-68, 273-74.

17 Leg. Hist. at 267 (statement of Congressman Harold T. Johnson).

18 Leg. Hist. at 263 (statement of Congressman Donald H. Clausen).

19 Leg. Hist. at 281-339.

20 Leg. Hist. at 320.

21 See Water Pollution Control Legislation (Part 3): Hearings Before the Subcommittee on Air and Water Pollution of the Committee on Public Works, United States Senate, 92nd Cong., 1st Sess. (1971) at 1192-98, 1205, 1212-13, 1215, 1252-53, 1267, 1321; see generally Joint Committee Part I at 40, 243, 343; Joint Committee Part II (Vol. I) at 1786, 1819, 1824-25, 2245; Joint Committee Part II (Vol. II) at 2418-19, 2449, 2458-59; Joint Committee Selected Materials at 172, 179, 202, 205, 233, 307, 310, 321, 428.

EPA Response

EPA disagrees that the placement of section 316(b) within the CWA precludes EPA to taking a primarily technology-based approach in developing the final rule for new facilities and compels EPA to implement section 316(b) on a case by case basis. EPA believes that the very limited Legislative History on section 316(b) make it difficult to glean very much guidance on how to interpret the statutory language and that because the language of section 316(a) is different from 316(b), that the language in the legislative history of section 316(a) does not necessarily apply to section 316(b). As stated in Response to Comment 068.007, EPA believes it is reasonable to interpret section 316(b)'s placement in a separate section of the CWA as indicative of the fact that it addresses cooling water intake. See Responses to Comments 068.007 and 068.008 for an explanation as to why EPA finds it reasonable to interpret the statute to allow it to take a primarily technology-based approach to the new facility rule. With respect to the issues of enforcement and the determination of effects referenced in the 1972 Legislative History, EPA has since 1972 had experience with the case-by-case approach taken until now, and has explained the problems inherent in a case-by-case approach, particularly where there are new facilities involved and a need to make permitting decisions in a shorter timeframe. See response to comment 316bNFR.507.004 and Section VI.B.2.c of the preamble.

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Subject Matter Code 2.2

Obligation Under 316(b)

Section 316(b) Addresses Only Intake Structure Technologies

There is one more thing to be learned from the plain words of § 316(b). The words of § 316(b) and related provisions of the Clean Water Act show that EPA's authority is limited to regulating intake structure technologies, not "cooling systems." Even as to CWIS technologies, EPA was authorized to regulate only four attributes: location, design, construction, and capacity. Conspicuously absent is authority to regulate broader subjects like "operation" or "operating conditions." Imposing operational restrictions would flout the fact that Congress granted EPA authority to regulate only intake structure technologies <FN 22>. Congress did not give EPA the authority, either expressly or by implication, to decide when a facility should or should not operate, when it should withdraw water or how much, or how many megawatts it should generate. For steam electric facilities, any operational restrictions necessarily reduce production. Such restrictions cannot be "intake technologies" within the plain meaning of § 316(b). See Part IX.B below.

Furthermore, imposing operating restrictions has no analogous precedent in the Clean Water Act, even under the effluent guidelines and new source performance standards of §§ 301, 304, and 306. These sections, which allow EPA to impose technology-based effluent limits on pollutant discharges, have never been interpreted to allow EPA to shut down plants or limit production. <FN 23>

Indeed, it would be radical to propose that EPA has the authority to regulate the production levels of industrial plants. For example, EPA does not have authority to set water quality-based requirements on a plant's internal processes. American Iron and Steel Inst. v. EPA, 115 F. 3d 979, 995 (D.C. Cir. 1997). And even mass-based effluent limitations are not used as a means of regulating production. Congress would be surprised if it were told that, by means of the Clean Water Act, it had authorized EPA to act as an Administrator of Industrial Production for the entire country.

Instead, the Agency's job is to identify the CWIS technology or technologies that will achieve the greatest reductions in pollutant discharges from industrial facilities, taking into account actual production levels. EPA's proposed rule necessarily assumes that by authorizing EPA to regulate the location, design, construction, and capacity of CWISs, Congress intended to give EPA virtually unlimited power over the nation's electric energy supply, including how entire production facilities are designed and built, how much they will cost, when they may operate, and how much power they may generate.<FN 24> Such a sweeping authorization, if it existed, would have been stated in clearer and broader words than the ones used in § 316(b). It is simply not credible that Congress intended to give EPA sweeping authority to regulate electric power production without mentioning it in the statute or the legislative history.

Footnotes

22. A cooling water intake structure (CWIS) is separate and distinct from the cooling water system (CWS) of a steam electric facility. EPRI classifies intake technologies into two groups on the basis of their fundamental method of reducing biological impacts: those that prevent or lower the potential for entrainment (exclusionary) and those that separate and

remove entrapped organisms (EPRI 1989). The exclusionary group includes physical and behavioral barriers located at the interface between the intake structure and the source waterbody. The second group includes separation and removal processes located between the point of withdrawal and the cooling water pumps, generally in the vicinity of existing apparatus that screens debris. By these definitions, the CWS supply pumps and all other elements of the CWS are not intake structure technologies.

Engineering design and plant operating practices confirm this distinction. Although linked, the CWS and CWIS are two entirely distinct parts of a larger whole (the power plant or the manufacturing facility). From both the engineering and operating perspectives, the point of separation is the intake to the CWS supply pumps. This distinction is apparent from the following:

1.CWS supply pumps are specified, bid, and purchased as separate components of the overall cooling water system, not the cooling water intake structure. The pump specifications depend primarily upon cooling system characteristics, such as the amount of cooling water required, the distance from the intake structure to the plant, and the associated changes in elevation.

2.CWS supply pumps are operated in direct conjunction with the cooling water system. For once-through cooling systems, CWS supply pump operation focuses on optimizing the main steam condenser performance (Julovich 1986). For recirculated cooling systems, CWS supply pump operation is governed by the amount of make-up required to offset system losses due to evaporation, blowdown and drift.

3.Cooling water treatment (chlorination, etc.) for once-through cooling systems is done by injecting chemicals at the CWS supply pumps. This chemical treatment is intended to protect the CWS, not the CWIS.

[FN also coded seperatley as 316bNFR.068.011]

23 This does not mean, however, that EPA is required to assume 365-days-a-year operation if the facts are otherwise. Permittees are free to specify anticipated operational levels in their permit renewal applications, and the permit writer may base the resulting permit on the specified levels. If a permittee anticipates limited production at a certain facility, it should be entitled to have that fact taken into account for § 316(b) purposes.

24 Equally important, such restrictions could seriously disrupt the pursuit of a rational energy policy and frustrate the regulatory and policy objectives of FERC and the state utility commissions.

EPA Response

EPA disagrees with the commenter in several respects.

First, as stated in the preamble, EPA emphasizes that it is not requiring wet cooling, or any process restrictions, but that instead it is regulating the capacity and location by establishing performance-based technology requirements on the dynamic flow of the cooling water intake structure that reduce impingement and entrainment at a level comparable (as defined in the rule) to that achieved by using closed-cycle cooling. Thus, this is not a process control, but rather as a control on the capacity (and to a lesser extent location - particularly with respect to the proportional flow requirements) of the cooling water intake structure. Section 316(b) authorizes EPA to impose limitations on the location, design, construction and capacity of CWISs. EPA interprets the statute to authorize it to regulate that volume of the flow of water withdrawn through a cooling water intake structure as a means of addressing "capacity." In re Brunswick Steam Electric Plant, Decision of the General Counsel No. 41 (June 1, 1976). Such limitations on the volume of flow are consistent with the dictionary definition of "capacity", the legislative history of the Clean Water Act, and the 1976 regulations. Id. Indeed, as Decision of the General Counsel No. 41 points out, the major environmental impacts of cooling water intake structures are those affecting aquatic organisms living in the volumes of water withdrawn through the intake structure. Therefore, regulation of the volume of the flow of water withdrawn also

advances the objectives of section 316(b).

With respect to the commenter's statement that the regulation will reduce production, EPA recognizes that there is an "energy penalty" associated with the Track 1 requirements and has factored this into its cost estimates in determining whether the requirements are economically practical in terms of measuring a cost to revenue ratio and whether there will be a barrier to entry. EPA points out that any regulatory costs to an industry result in that industry producing less per unit of cost invested. EPA disagrees that the technology-based sections of the CWA, sections 301, 304, and 306 do not authorize EPA to shut down plants or limit production. Courts have often held that some level of economic dislocation may occur under these technology based requirements. See., e.g., American Iron and Steel Inst. v. EPA, 526 F.2d 1027, 1054 (3rd Cir. 1975)(While it is clear that the Administrator must consider cost, some amount of economic disruption was contemplated as a necessary price to pay in the effort to clean up the nation's waters, and the Administrator was given considerable discretion in weighing costs."); EPA v. National Crushed Stone Ass'n, 449 U.S. 64, 79 (1980)(" . . .Congress foresaw and accepted the economic hardship, including the closing of some plants, that effluent limitations would cause.")

EPA wishes to correct to some of the commenter's comments related to EPA's authority t require in plant limits of discharge in its technology-based rules. (Again, EPA views its final rule not as an in plant limit, but as controls on the location, capacity, design and construction of CWISs.) The commenter's citation to American Iron and Steel Inst. v. EPA does not apply to technology-based limitations. That case dealt only with water quality standards, where the Court found that as long as the ultimate discharge met water quality standards, no further in plant controls could be imposed, but not with technology-based restrictions which by the plain language of the statute, allow for EPA to consider "the process employed" and "process changes" (CWA section 304(b)(1)(B) or 304(b)(2)(B)) in establishing best available technology or best practicable technology, or under section 306(a)(1), new source performance standards, "a standard . . which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through the application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants." EPA notes that two courts of appeals have already upheld the legality of in-plant technology-based limitations, when (as here) dilution makes monitoring at the end of the pipe infeasible and when (as here) they are necessary to evaluate the effectiveness of the treatment technology. See Texas Mun. Power Agency v. EPA, 836 F.2d 1482, 1488-90 (5th Cir. 1988). See also Public Service Co. v. EPA, 949 F.2d 1063, 1065 (10th Cir. 1991) (upholding application of EPA's 1979 internal wastestream rule, 40 C.F.R. § 122.45(h)).

Finally, the CWA does confer on EPA the authority to regulate the location, design, constructio and capacity of cooling water intake structures. See Legislative History of the Water Pollution Control Act Amendments of 1972, 93rd Cong., 1st Sess., at 196-198 (1973)(colloquy between Senator Muskie and Senator Buckley in which Mr. Buckley cites several newspaper articles including one from the New York Times, dated October 4, 1972, where AEC has required wet cooling in order to deal with, among other things, impingement and entrainment caused by once through cooling "once through cooling systems . . . suck . . water from the river . . . and the Fisherman's Association said this would kill much of the river's fish by heating and battering them." In the colloquy, Senator Buckley is concerned that this legislation will preclude the Atomic Energy Commission from regulating

more stringently than EPA . Senator Muskie states in reply, “We considered that this kind of authority should be in EPA and not in AEC, and in order to put the authority there, we put it in this act, and not in AEC, and that is where it is.”). EPA has done this in a manner that considers the energy impacts of the rule it has promulgated and has considered the energy impacts of other options it has rejected.

Regarding the definition of cooling water intake structure, EPA disagrees with the comment. Se response to comment 361bNFR[068.011?]. EAD who is responding to this?

Comment ID 316bNFR.068.011

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Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

A cooling water intake structure (CWIS) is separate and distinct from the cooling water system (CWS) of a steam electric facility. EPRI classifies intake technologies into two groups on the basis of their fundamental method of reducing biological impacts: those that prevent or lower the potential for entrainment (exclusionary) and those that separate and remove entrapped organisms (EPRI 1989). The exclusionary group includes physical and behavioral barriers located at the interface between the intake structure and the source waterbody. The second group includes separation and removal processes located between the point of withdrawal and the cooling water pumps, generally in the vicinity of existing apparatus that screens debris. By these definitions, the CWS supply pumps and all other elements of the CWS are not intake structure technologies.

Engineering design and plant operating practices confirm this distinction. Although linked, the CWS and CWIS are two entirely distinct parts of a larger whole (the power plant or the manufacturing facility). From both the engineering and operating perspectives, the point of separation is the intake to the CWS supply pumps. This distinction is apparent from the following:

1. CWS supply pumps are specified, bid, and purchased as separate components of the overall cooling water system, not the cooling water intake structure. The pump specifications depend primarily upon cooling system characteristics, such as the amount of cooling water required, the distance from the intake structure to the plant, and the associated changes in elevation.
2. CWS supply pumps are operated in direct conjunction with the cooling water system. For once-through cooling systems, CWS supply pump operation focuses on optimizing the main steam condenser performance (Julovich 1986). For recirculated cooling systems, CWS supply pump operation is governed by the amount of make-up required to offset system losses due to evaporation, blowdown and drift.
3. Cooling water treatment (chlorination, etc.) for once-through cooling systems is done by injecting chemicals at the CWS supply pumps. This chemical treatment is intended to protect the CWS, not the CWIS.

EPA Response

In the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the intake pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed. See Section VI.A.2 in the preamble of today's rule.

Comment ID 316bNFR.068.012

Subject Matter Code	2.2
Obligation Under 316(b)	

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Section 316(b) Requires Costs to Be Considered

If there were any doubt that § 316(b) requires economic costs to be considered, it would be dispelled by viewing § 316(b) in the context of other federal laws and requirements. Section 316(b) uses "best available" to describe the technologies Congress wanted EPA to consider for minimizing AEI. Wherever Congress used these words in other parts of the Clean Water Act, such as §§ 301 and 306 <FN25>, it meant for costs to be considered. Moreover, one of the few things the legislative history says about BTA is that it means "best technology available at an economically practicable cost." 118 Cong. Rec. H9130 (daily ed. 33,762, 1972), Leg. Hist. at 264 (remarks of Congressman Clausen, for House Conferees).

Moreover, other laws and mandates, such as Executive Order 12866 (§§ 1.a, 1.b(5), (6), (7)), the Unfunded Mandates Reform Act, 2 U.S.C. § 1501 et seq. (UMRA), and the Small Business Regulatory Fairness Act, 5 U.S.C. § 601 note (SBREFA), reveal that a reasoned weighing of costs and benefits has become, as a matter of federal policy, a necessary feature of government decisionmaking. E.O. 12866, for example, requires EPA to assess costs and benefits and propose or adopt a regulation only if the benefits justify its costs.<FN 26>

Finally, EPA itself has consistently recognized that costs play a role in applying § 316(b). This can be seen in Seacoast Anti-Pollution League v. Costle, 597 F.2d 306, 311 (1st Cir. 1979), which upheld the Administrator's finding that "moving the intake further offshore might further minimize the entrainment of some plankton, but only slightly" and stating that "[t]he legislative history clearly makes cost an acceptable consideration in determining whether the intake design reflect[s] the best technology available."

In short, EPA has long recognized that there should be some reasonable relationship between the cost of CWIS control technologies and their environmental benefits. 65 Fed. Reg. 49,094 col. 2. EPA now concludes that a formal cost test is appropriate in determining BTA. Id. And, as discussed below, EPA is bound by law to follow the mandates of E.O. 12866, UMRA, and SBREFA.

Footnotes

25 Indeed, §§ 301 and 306 are referenced in § 316 itself as the basis for identifying the dischargers subject to § 316(b) (i.e., those point source dischargers otherwise subject to effluent limitations guidelines and new source performance standards).

26 See Appendix K for letters from UWAG to Deborah G. Nagle, EPA, dated January 10, 1997, March 19, 1997, and July 18, 1997, discussing E.O. 12866 and the use of economic data in Agency decisionmaking.

EPA Response

EPA agrees that section 316(b) gives EPA discretion to consider costs. See response to comment 316bNFR206.014. However, just as is the case for BAT or NSPS, EPA is not required to balance costs and benefits in establishing these requirements. With respect to E.O 12866, EPA complied with

the Executive Order- and provided an assessment of the costs and benefits (including qualitative measures of the costs and benefits that are difficult to quantify, but nevertheless essential to consider) to OMB and is presenting these analyses in the record for the final rule. See the preamble to the final rule. The E.O. does not change any aspect of the Clean Water Act or the agency's authority or responsibility, as authorized by law (Sec. 9), nor does it create any right or benefit, substantive or procedural for purposes of judicial review.)

EPA's compliance with UMRA is discussed in the preamble to the final rule.

Under RFA as amended by SBREFA, EPA is required to examine whether a rule will have a significant impact on a substantial number of small entities, and if so to prepare a Regulatory Flexibility Analysis. EPA performed this analysis and the Administrator certifies that the rule will not have a significant impact on a substantial number of small entities. See the preamble to the final rule and the Economic Analysis.

Comment ID 316bNFR.068.013

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Subject Matter Code 2.2

Obligation Under 316(b)

A Resource Management Approach Is Needed

Governments have long regulated people's use of fish and wildlife; the 1648 Laws and Liberties of Massachusetts provided a bounty of ten shillings for every wolf killed within ten miles of a plantation. In the modern era, Congress has undertaken to regulate human use of the fishery resource.

Section 316(b) cannot be interpreted properly without regard to this context of natural resource laws. There is nothing in § 316(b), either its text or its legislative history, that suggests that users of cooling water should be uniquely burdened with protecting the fishery resource.

Over the years, Congress has endorsed a fisheries management approach in a series of statutes, most notably the Magnuson Fishery Conservation and Management Act of 1976 (amended in 1986) and the Sustainable Fisheries Act, administered by the National Marine Fisheries Service (NMFS).

Although there are those who endorse pure preservation rather than management of natural resources, that is not the course Congress traditionally has taken, and advances in science have confirmed the wisdom of Congress' choice. The science of fish population dynamics has advanced over the past 20 years, and scientists' knowledge of how fish populations maintain themselves and interact with other populations continues to expand. Fishery managers commonly use this information to assess fish stocks.

This approach, well established in federal law and long federal practice, views the fishery as a renewable resource that can be managed. It recognizes that the federal government need not try to protect every fish, let alone every fish egg,<FN27> but should instead preserve the fishery resource itself. And it recognizes that nature has mechanisms that compensate for individual losses to populations. Natural processes that limit population growth at high densities (e.g., lower survival, growth, and emigration) or increase numerical growth at low population densities (e.g., higher survival, growth, and immigration) are examples of such mechanisms, collectively referred to as "compensation." See Appendix B to these comments, which discusses compensation.

The Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 et seq., governs determinations of the allowable harvesting of fish species and focuses on maximizing productiveness of fish populations, while ensuring sustainability. It sets forth "national standards" that should govern fisheries management, including Principle 1: "conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the fishing industry." 16 U.S.C. § 1851.

Recent regulations issued by NMFS and the Fish and Wildlife Service (FWS) (collectively the "Services") clarify that the "optimum yield" is based on the concept of "maximum sustainable yield" (MSY). 50 C.F.R. § 600.310(c)(1)(i) (1999). MSY is defined as "the largest long-term average

catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions." Id.

1. Maximum Sustainable Yield

The NMFS regulation establishes limits that are designed to prevent overfishing, a concept also based on MSY. The rule defines "overfishing" conservatively as fishing "at a rate or level that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis." 50 C.F.R. § 600.310(d)(1)(i) (1999). However, NMFS recognizes that fish populations can withstand a fairly high level of exploitation beyond the MSY fishing rate and still remain sustainable:

How low is too low? While the fishery science literature does not provide a definitive answer to this question, NMFS believes that a prudent rule can be established as follows: Two of the best known models in the fishery science literature find that, on average, the stock size at MSY is approximately 40 percent of the stock size that would be obtained if fishing mortality were zero (the pristine level). . . . Also, the fishery science literature contains several suggestions to the effect that any stock size below about 20 percent of the pristine level should be cause for serious concern. In other words, a stock's capacity to produce MSY on a continuing basis may be jeopardized if it falls below a threshold of about one-fifth the pristine level.

63 Fed. Reg. 24,212, 24,219 (May 1, 1998) (emphasis added). Thus, NMFS recognizes that maximum productivity from a stock can be achieved by reducing the stock size by as much as sixty percent and that the population will be able to sustain or replace itself roughly until the stock size is reduced by about 80 percent.

In short, federal fishery managers recognize that high mortality in wild populations is natural, that (due to compensation and other demonstrated natural mechanisms) increased mortality can result in increased production, and that the effects of added mortality due to fishery exploitation are reversible until a threshold level is reached (Goodyear 1993). The Fishery Management Councils established under the Magnuson-Stevens Act use these concepts to set target mortality rates that are intended to achieve MSY and to prevent fish populations from being reduced to a level that would jeopardize their long-term sustainability.

Footnotes

27 Threatened and endangered species may require special consideration in accordance with the Endangered Species Act.

28 EPA itself has recognized this fundamental fact with respect to early life stages. See EPA, Economic and Engineering Analyses of the Proposed § 316(b) New Facility Rule (August 2000) (EEA), p. 11-4, DCN:1-5046-PR. That the mortality occurring from entrainment and impingement is not additive is well understood. See generally Appendix B to these comments.

EPA Response

EPA discusses why it has adopted a primarily technology based approach to minimize impingement and entrainment for new facilities rather than a population approach in the preamble to the final rule. See response to comment 316bNFR.068.037 and Section VI.B.2.c of the preamble.

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Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

Spawning Stock Biomass per Recruit

Fisheries managers employ "biological reference points" to evaluate the status of a fish population and to guide them in setting allowable fishing rates. Biological reference points are most commonly expressed in terms of "Spawning Stock Biomass per Recruit" (SSBPR), defined as the total weight of a mature spawning stock that would be generated over the lifetime of an individual recruit (Goodyear 1993). A "recruit," in fisheries terminology, is a fish that has reached an age or size that makes it susceptible to capture by conventional fisheries sampling gear (Goodyear 1993). The use of SSBPR to define biological reference points is grounded in the assumption that the lifetime reproductive capacity of a typical recruit provides an indirect measure of the capability of a population to replace itself, i.e., remain sustainable (Goodyear 1977 (DCN:1-3027-EA); Goodyear 1993). As fishing mortality (F) increases SSBPR decreases, because individuals don't live as long and therefore contribute less biomass to the spawning population.

The two SSBPR-based reference points most commonly used by fisheries managers in the past have been F35% and F20%. F35% is the fishing mortality rate that will lead to a SSBPR that is 35% of the value when the stock is unfished (F=0). F35% is often used as a default goal for achieving MSY. F20% is the fishing mortality rate that will lead to a SSBPR that is 20% of the value when there is no fishing. F20% has been used as a default threshold reference point for recruitment overfishing, i.e., a fishing mortality rate that is high enough to threaten the long-term sustainability of a population. For populations that are believed to have a low compensatory capacity or for which little information on compensatory capacity is available, a more conservative overfishing reference point may be used. See Appendix B to these comments.

Goodyear (1977) (DCN:1-3027-EA) showed that entrainment and impingement mortality, like fishing, reduces SSBPR, and he described a method for calculating the combined effects of all three sources of mortality on SSBPR. All three remove fish from a population, thus eliminating their contributions to future generations of fish. It does not matter if a fish is cropped by a power plant or by a fisherman – in either case it is gone from the population.

There are, however, two major differences between power plant mortality and fishing mortality. First, for most species power plants crop fish at a much earlier age than fishermen do, because fish large enough to be caught by fishermen are usually also large enough to be no longer vulnerable to entrainment and, if impinged, are more likely to survive. Second, for most species a fish is vulnerable to fishermen for many more years (and over a much wider range within its habitat) than it is vulnerable to power plants. When the naturally high mortality rate of early life stages that prevails for most aquatic species is taken into account, this means that fishing has a correspondingly greater effect on the level and sustainability of the fishery than does entrainment and, to a lesser extent, impingement mortality.

Goodyear's (1977) (DCN:1-3027-EA) analysis showed that additional mortality due to cooling-water withdrawals can have serious adverse consequences if SSBPR has already been reduced to a low level by overfishing. These results also show that the same level of entrainment/impingement mortality will have considerably less of an impact on a population that is only lightly or moderately fished. And reducing the level of entrainment and impingement may do little good if overfishing continues unabated.

When reliable estimates of the compensatory capacity of a population exist, spawner-recruit models (see Appendix B) can be used to develop more realistic and less conservative biological reference points (NRC 1998). Appendix B demonstrates a method for using spawner-recruit models to quantify impacts of entrainment and impingement on fish populations. As with the SSBPR approach, spawner-recruit analyses show that mortality due to entrainment and impingement is likely to have negligible effects on the abundance or yield of a fish population unless that population is already being fished at a level that greatly exceeds Fmsy.

As the above discussion demonstrates, biological reference points and quantitative assessment tools currently used in fisheries management also can be used to evaluate the likelihood that entrainment and impingement mortality will reduce the reproductive capacity of a fish population to a level that warrants management concern. Fisheries management concepts, therefore, provide scientifically sound principles for determining whether cooling-water withdrawals can cause adverse environmental impacts on vulnerable fish populations.

EPA Response

EPA agrees that fishery management tools and concepts can be used to assist in evaluating entrainment and impingement impacts. However, as discussed in detail in today's preamble, EPA has concerns over the uncertainty associated with many of these tools, including spawner-recruit proxies, and the data sets that are currently available to make these tools useful and accurate for the vast number of fish and shellfish species that are affected by cooling water intake structures. In addition, EPA notes that extensive, long-term data sets (20 or more years of monitoring data) are often required to evaluate whether or not cooling water intake structures are affecting a fish population (see response to comment 316bNFR.507.004). Because precise population-level assessments require considerable amounts of time and monitoring data, EPA does not believe they are appropriate under Track I of today's rule, which provides quicker permitting for new facilities. Please see section VI.B.2.c of today's preamble for further discussion of spawner-recruit proxies.

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Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

Compensation

As noted by Myers (see Appendix B to these comments), the concept of "compensation" is fundamental to understanding and managing biological resources. For any biological population to persist, reductions in population size caused by natural environmental fluctuations must result in increased survival, growth, or fecundity of the remaining individuals. Mechanisms of compensation have been well-studied in both terrestrial and aquatic systems. The compensatory response to reductions in population size is the key factor that permits fish populations to sustain themselves despite enormous natural mortality for early life stages and even intensive harvesting of adults. See Appendix B.

Long-term research surveys have demonstrated compensation in a variety of marine, estuarine, and freshwater fish species. See Appendix B. Field experiments in which fish population sizes are artificially manipulated have also been used to demonstrate compensation. Id. Appendix B contains a table of approximately 50 recent scientific studies demonstrating specific mechanisms responsible for compensation in a variety of fish species. Most of these studies have been published within the last 10 years.

The National Research Council (NRC 1998, p. 44) has recognized the importance of compensation for modern fisheries management:

Many species appear to have strongly compensatory [spawner-recruit] relationships; that is, per capita recruitment increases significantly as stock size decreases. Reference levels are now more commonly based on a % [SSBPR], but the percentage is often specified by analogy with other stocks or by using the results [of comparisons among other biological reference points.] A knowledge of the compensatory capacity of the stock is necessary to define the most appropriate [biological reference points] for a stock. Even without such knowledge, however, a conservative % [SSBPR] still can be selected.

(Citation omitted). Spawner-recruit relationships of the type discussed by the NRC are used to manage two of the estuarine-dependent fish species, striped bass and weakfish, listed in Tables 11-10 and 11-11 of EPA's Economic and Engineering Analyses (EEA) (NMFS 1998; NMFS 2000a). Methods discussed by the NRC can be used to incorporate the concept of compensation in management strategies for species for which spawner-recruit data are not available.

Fisheries scientists have demonstrated the importance of compensation for ensuring the continued persistence of fish populations, and fisheries managers routinely consider compensation when establishing harvesting regulations. There is no reason why compensation should not also be considered in establishing regulations for managing fish species susceptible to entrainment and impingement.

EPA Response

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). In addition, EPA notes that extensive, long-term data sets (a minimum of 15 years of monitoring data) are necessary to calculate numeric compensation values. Because precise population-level assessments require considerable amounts of time and monitoring data, EPA does not believe they are appropriate under Track I of today's rule, which provides quicker permitting for new facilities. Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

WITHOUT THE PROPOSED RULE, § 316(b) HAS WORKED TO MINIMIZE IMPACTS
Section 316(b) Has Been Implemented Successfully on a Site-Specific Basis, Even Without a Regulation

Despite the absence of a uniform regulation of the type EPA proposes – or any regulation or final guidance, for that matter – § 316(b) has been implemented, by and large, in a reasonably efficient way, and with considerable success. As of 1991, the Power Statistics Data Base indicated that over 93% of the over 1,400 units included in the database at that time had completed § 316(b) demonstrations, were in the process of doing so, or had received a determination that § 316(b) did not apply <FN 29>. Not only has § 316(b) been widely applied even in the absence of any rule (much less one setting generic, minimum requirements), in a number of cases cooling water users have made changes to their intake structures that produced substantial benefits.

Indeed, some of the examples used by EPA to show the seriousness of the entrainment and impingement problem could better be used to show the effectiveness of the solutions. Consider the Brunswick Station, for example. EPA says that a model of entrainment mortality in the Cape Fear Estuary predicted a 15 to 35% reduction in the species' population. 65 Fed. Reg. 49,073 col. 1.

The 1979 report cited by EPA did estimate that Brunswick might cause losses of 3 to 4 billion larvae and post-larvae per year. But much has happened since 1979. Since then, the owner of Brunswick installed a diversion fence at the mouth of the intake canal, fine mesh screens, and a fish return system. Comprehensive biological monitoring has shown that the fish diversion structure reduced the density by 43% and the weight by 67% of larger organisms impinged at the plant. Moreover, seasonal flow minimization and fine-mesh traveling screens have reduced entrainment by almost 90% for some species and life stages.

Similarly, EPA cites the Crystal River plant, attributing to it an annual loss of 23 tons of fish and shellfish of recreational, commercial, or forage value. 65 Fed. Reg. 49,073 col. 1 n. 12. But these "losses" appear to be based on entrainment estimates, and subsequent entrainment studies at Crystal River show that many entrained organisms survive. Moreover, the owner of Crystal River established an Environmental Enhancement Program, including bar racks, traveling screens, flow minimization practices, and the operation of a fish hatchery. The hatchery has produced and released 742,000 red drum, 378,000 sea trout, and 56,000 white shrimp during its operation.

The Salem Generating Station (Salem) in New Jersey has made a number of improvements to its CWIS to reduce impingement mortality over the years. Most recently, as a component of the state BTA determination, Salem has installed several modifications to its Ristroph screens, including improved fish bucket design to reduce stress to fish, smooth-Tex screen panels to reduce abrasion of the fish, and composite screen frame materials to improve the hydrodynamics and allow faster rotating speeds to minimize the time fish are impinged on the screens. These improvements to the screens

have substantially improved survival rates.

Salem also conducted a multi-year feasibility study on the use of sound to deter fish from entering the intake area. This study demonstrated that sound was an effective deterrent for certain species at certain times of the year. The state is considering the results of this study as part of its review of Salem's permit renewal application.

At the Surry Power Station in Virginia, the Station owner designed and installed Ristroph screens well before most of the § 316(b) program work was carried out, because of concerns about impingement of young blueback herring during their annual migration. The screens were standard traveling screens that were modified by adding a "bucket" that holds water, as well as any organisms in the water, to the front of the screen as the screen travels out of the water. The screens were designed to use a low-pressure washwater system and to rotate continuously, instead of only when the screens become loaded with trash.

The Surry screens were installed in the early 1970s and are still in use today. A Screen Assessment Program was undertaken several years after installation. No changes were required as a result of this § 316(b) assessment, because the survival rate was already, with the new screens, over 90%. The development of the Ristroph screens became a viable option throughout the industry, and even though it was not developed as a result of the § 316(b) process, it was important for the impingement issue nationwide and received widespread recognition.

Additional details on the experience at a number of plants cited by EPA may be found in Appendix I to these comments.

Footnotes

29 While the Power Statistics Data Base still exists, it no longer includes any field for § 316(b), so it was not possible to produce an up-to-date report.

EPA Response

The requirements of section 316(b) have been implemented at many existing facilities and have worked to reduce the impacts associated with these facilities. However, under the existing approach, the Director's determinations of whether the appropriate studies have been performed or whether a given facility has minimized adverse environmental impact have often been subject to challenges that can take a long time to resolve and may impose significant resource demands on permitting agencies, the public, and the permit applicant. The transaction costs are of concern to EPA and the commenter, particularly with respect to new facilities. In addition, the existing approach might result in permitting decisions that are less consistent than they would be if national requirements were in place. This final rule establishes national technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. The record demonstrates that these approaches are overwhelmingly technically available and economically practicable, and that they have acceptable non-water quality environmental impacts (including energy impacts).

The examples offered indicate that the performance of these existing facilities improved when they took some action to implement technologies designed to reduce impingement and entrainment. The

two-track approach in the final rule is intended to foster such actions by new facilities. The final rule balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This combination of requirements will result in improved and more consistent performance in reducing impacts at new facilities that use cooling water intake structures.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

EPA Has Not Demonstrated the Need for a Single Minimum Set of Requirements

Given the above history, it is not at all clear that the implementation of § 316(b) is "broken" and needs "fixing." EPA, however, feels that a single, simplistic national § 316(b) standard is needed, for five reasons:

1. The current site-specific approach has produced inconsistent results;
2. The site-specific approach places unreasonable demands on the regulatory agency to make decisions on a case-by-case basis;
3. Site-specific permitting demands have created a disincentive to revisit § 316(b) determinations upon permit renewal;
4. The methodologies used historically to assess the potential for AEI have been inconsistent, involve substantial uncertainty, and may underestimate impacts to aquatic populations, and recent advances in environmental assessment techniques provide better tools for assessing the potential for adverse environmental impact; and
5. The process makes planning uncertain for industry.

65 Fed. Reg. 49,071-74, 49,079.

As to the first reason, EPA has not supported its conclusion that the "inconsistencies" it perceives in various § 316(b) studies result from a flawed process, rather than differences in the facts at different sites. Because the § 316(b) questions depend so heavily on site-specific factors, it would be surprising if studies were entirely "consistent" from site to site. Any attempt to impose rigid consistency would probably be overprotective in most cases. Moreover, since state authorities and fishery experts have a variety of different values to protect, some of which may conflict with others, it would, again, be wildly unrealistic to expect "consistency." "Inconsistency" may merely mean that different states have balanced competing values differently, which is as it should be. While it is true that some states have done less than others, the solution is not to make a one-size-fits-all rule, but to establish a consistent process.

EPA Response

Under the existing approach, the Director's determinations of whether the appropriate studies have been performed or whether a given facility has minimized adverse environmental impact have often been subject to challenges that can take a long time to resolve and may impose significant resource demands on permitting agencies, the public, and the permit applicant. In addition, the existing approach might result in permitting decisions that are less consistent than they would be if national requirements were in place. For example, some States and EPA regions have required significant section 316(b) studies to be performed by facilities, whereas in other cases determinations have been

based on limited actual background and ecological data.

This rule establishes national technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Under the two-track approach, the rule does not establish a single minimum set of requirements. Rather, the two-track approach balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This combination of requirements will result in improved and more consistent performance in reducing impacts at new facilities that use cooling water intake structures.

Second, the argument that the site-specific approach is too complicated, too burdensome, or too unpredictable misses the mark. A simple rule is wrong if it cannot cope with nature, which is complicated. Both § 316(b) questions – the question whether there is "adverse environmental impact" and the question what to do about it – depend on complex biological, hydrological, and physical facts: what kinds of fish are present at the site, how fast they swim, where they congregate at different times of the year, how they reproduce, when they reproduce, and what are the physical characteristics of the place where water is withdrawn. Simplicity is a good thing, but there are some cases in which one can have simplicity only by blinding the process to important complexities.

That is not to say that a simplistic, overprotective approach has no role at all in § 316(b). But a simplistic approach should be only one alternative that a permittee may choose in circumstances where the need to begin construction promptly outweighs the cost advantage of a more scientific, more time-consuming site-specific biological assessment.

EPA Response

The historical case-by-case approach to 316(b) decision making imposes a high implementation burden on both the regulated community and the regulatory authorities that must implement section 316(b) requirements. The historical decision-making process requires that each regulated facility must develop, submit, and refine studies that characterize or estimate potential adverse environmental impact. Such studies can take several years to complete and require the support of a multi-disciplinary team. In addition, given the iterative nature of the assessment process, industry as well as EPA regional and State regulatory authorities must expend considerable resources assessing study plans and methods for characterizing the environmental impact occurring at each facility and evaluating those data to determine what constitutes BTA for each specific facility. Ultimately, little agreement may result. This is why EPA has established a two-track rule, whereby if the permittee so chooses, it may elect to meet requirements that the record demonstrates are technically available, economically practicable and have acceptable non-water quality environmental impacts including energy impacts. If the permittee prefers to conduct a detailed site-specific analysis of its performance, it has that option in Track II.

Under the two-track approach, the final rule provides both a simpler (i.e., fast) track and a track that allows more in-depth consideration of the complexities of the relevant environmental factors at the site. The two-track approach balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This combination of requirements will result in improved and more consistent performance in reducing impacts at new facilities that use cooling water intake structures.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

Third, EPA's argument that the burdens of site-specificity have stifled reassessment of § 316(b) demonstrations during permit renewals are unfounded. UWAG submits that nothing inherent in the site-specificity of the assessment process has prevented reassessment upon permit renewal. <FN 30> The history of several permittees' efforts to improve their intake structures, summarized above, suggests that in fact they have been active in making changes. If changes have not always been made at permit renewal time, it is probably because (1) absent changes to either the facility or the waterbody, no reassessment was needed and (2) EPA itself issued guidance explaining that reassessment was not required, for that very reason. See Memorandum from Gail B. Cooper to Joseph J. Zedrosser, Legal Opinion on § 316 of the Clean Water Act at 6-7 (Feb. 24, 1982).

Footnotes

30 If EPA is correct that § 316(b) requires uniform federal decisions on required technologies, it would be the only technology-based rule that EPA requires to be revisited during permit renewal, without an intervening change in its rules.

EPA Response

The historical approach to 316(b) decision making is less than optimal with regard to how it supports revisiting section 316(b) permit conditions when permits come due for renewal. Under the existing permitting process numerous factors tend to perpetuate the status quo. Given that most facilities that use cooling water intake structures became operational before 1980, this reluctance to fully reconsider permit conditions in light of new technologies is a significant concern. The new facility rule will clarify performance requirements and specify monitoring requirements, thereby better supporting permit re-issuance. It also allows sufficient flexibility to use, and creates an incentive to pursue, innovative technologies.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

Fourth, EPA's claim that a site-specific approach is too burdensome ignores the fact that the new proposed rule itself requires extensive site-specific baseline biological and monitoring studies – far more extensive, in UWAG's view, than should be required for most new facilities. <FN31> 65 Fed. Reg. 49,119 col. 2-3; see Part XI below. Thus, the rule does not avoid the complexity and burden of site-specificity; it merely heaps them on top of already stringent technological requirements. The regulator's life is not simplified, and his need for technical support on biological issues is not lessened.

Footnotes

31 Under EPA's proposed rule, the site-specific information can be used for only one purpose: to make the requirements more stringent. See proposed §§ 125.84(f) & (g). 65 Fed. Reg. 49,119 col. 1.

EPA Response

The final rule has been revised to reduce the characterization and monitoring burden associated with the rule. In addition, the two-track approach in the final rule balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. Under Track I, data collection requirements have purposefully been minimized to provide a fast-track compliance alternative. See response to comment 316bNFR.068.018.

Fifth, EPA provides no evidence that there has been widespread inaccuracy or underestimates of effects. If it is true that existing models have, in some cases, underestimated the impacts of water withdrawal on fish populations, it is also true that others have overestimated them. For example, subsampling can lead to overstatements of impingement for some species. See Bailey 1998. At certain PEPCo plants, the bias of estimates based on subsamples occurred because it was assumed that impinged fish and crabs constantly accumulated at the rate measured during the sample. However, crabs are capable of leaving the screens after resting there for a while, and so the only crabs impinged were those on the screens at the time they were rotated. If screens are rotated once a day, this may be only a small fraction of the crabs that were on the screens during the day. PEPCo data indicate that a similar phenomena exists for fish, though the mechanism is less clear. Id. at 8-6. By measuring impingement for a short period, such as 30 minutes, and then multiplying by 48 to estimate 24-hour impingement, the estimate of impingement overstated the actual impingement. Id.

Likewise, models can overestimate entrainment. Early assessments of entrainment at the Chalk Point Plant concluded that there were large entrainment losses for forage species. Later, more refined studies show that these early assessments overestimated entrainment loss. Id. at 8-12. Specifically, the Phase 2 entrainment evaluations for Chalk Point estimated large entrainment risks for bay anchovy. More extensive studies, however, showed that the earlier evaluations were too conservative. It had been assumed that the absence of fewer than 22 MM larvae in samples from the earlier study had been a sampling artifact, but in fact this occurred because the smaller larvae generally were not in the vicinity of the power plant. For that reason a portion of the larvae that were assumed to be entrainable by the second phase estimates were not in fact entrainable. Also, by comparing estimates of the entrainment rate from the hydrodynamic model with that from samples of cooling water, it was learned that larval densities in the cooling water during daylight hours were much lower than predicted by the hydrodynamic model. Discovery of these phenomena in the later studies showed that the earlier Phase 2 estimates had been too high. Id. at 8-14.

EPA Response

Models are one tool that can be used to assess one aspect of cooling water intake structure impacts. However, as discussed in Section III and VI.B of the preamble to the final rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including, but not limited to, assessments of fish and aquatic organism population impacts.

In addition, under the existing approach to 316(b) permitting, there are many issues, such as the nature and degree of impacts, the scope of impacts, and the species of concern, that remain undefined and contribute to variability in permitting decisions.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

While UWAG agrees that large natural fluctuations in aquatic populations occur for some species and that methods do not exist to predict effects with perfect certainty, this is not a reason to abandon fish population studies. Fishery managers use statistical methods for estimating and bounding the uncertainties of population estimates, including confidence limits, model sensitivity analyses, and Monte Carlo probabilistic methods. See Part III.F. above. These techniques are no less useful for §316(b) analysis. <FN 32>

Furthermore, EPA's own Ecological Risk Assessment Guidelines recognize the inevitability of uncertainty and recommend ways of managing it:

Nearly every assessment must treat situations where data are unavailable or available only for parameters other than those of interest . . . Data gaps can often be filled by completing additional studies on the unknown parameter . . . At the least, opportunities for filling data gaps should be noted and carried through to the risk characterization. Data or knowledge gaps that are so large that they preclude the analysis of either exposure or ecological effects should also be noted and discussed in risk characterization.

63 Fed. Reg. 26,846, 28,869 (1998).

Footnotes

32 In addition, results of population estimates can be compared to results from other measurements of ecosystem health, such as biocriteria assessments or long-term fish abundance trends, as part of a "weight-of-the-evidence" approach to lessen uncertainty.

EPA Response

Some degree of uncertainty may be unavoidable in impact assessments. However, as discussed in Section III and VI.B of the preamble to the final rule, EPA believes that for new facilities, it makes more sense to measure adverse environmental impact associated with cooling water intake structures in terms of impingement and entrainment because this is more objective and certain to measure. See 316bNFR.068.018.

Also, differences in the methodology used in each assessment can be attributed largely to the phased approach typically used for § 316(b) impact assessment. Ordinarily information gathering is limited to what is necessary (coupled with conservative assumptions about other parameters) to make a reasoned decision. For example, determinations of the potential for AEI at many power plants were made using site-specific estimates of the number of individuals entrained or impinged, coupled with the extremely conservative assumption that all entrained or impinged organisms perish. If such information proves sufficient for a reasoned determination, then no additional studies are necessary.

For some power plants, however, it has been determined that an additional assessment phase, to estimate accurately the number of organisms actually cropped by entrainment or impingement, was required. In these cases, facilities conducted site-specific studies to estimate entrainment or impingement mortality or both. These mortality rates then were applied to estimates of numbers entrained or impinged to provide projections of numbers lost. This additional information produced more accurate loss estimates that were, in most cases, considerably lower than the predicted numbers lost under the conservative assumption of 100 percent mortality. <FN 33>

In many cases investigators assessed population-level effects using highly conservative assumptions. Again, this is consistent with an efficiently phased approach. For example, commonly used measures of power plant effects, such as conditional mortality rates or equivalent adults, were evaluated under the conservative assumption that no density-dependent (i.e., compensatory) processes operated in the population to reduce the population-level consequences of entrainment or impingement. Even though the importance of such processes was recognized in the earliest days of § 316(b) assessments (e.g., Van Winkle 1977), explicit incorporation of compensatory effects was limited to those assessments in which a reasoned determination could not be made based on the conservative assumption of no compensation.

This phased approach to impact assessment, beginning with the most conservative assumptions as described above, explains many of the differences in the assessment approaches used at various power plants. Incorporation of the results of more sophisticated information and assessment techniques produced more accurate estimates of power plant effects that tended to be lower, often considerably lower, than would have derived from more conservative approaches. Thus, differences in assessment techniques among power plants do not result in evaluations that are “inconsistent” or “incomplete.” Instead, these differences merely reflect different levels of analytical sophistication needed to address site-specific considerations.

Footnotes

33 In fact, explicit incorporation of entrainment survival in estimates of power plant effects had a dramatic effect on the perceived population effects of cooling water withdrawals on the Hudson River Estuary (Englert and Boreman 1988).

EPA Response

See responses to 316bNFR.068.018, 316bNFR.068.020 and 316bNFR068.021.

Comment ID 316bNFR.068.024

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

EPA's assertion that "recent advances in environmental assessment techniques now provide better tools to monitor for impingement and entrainment and to detect impacts associated with the operation of cooling water intake structures" (65 Fed. Reg. 49,074 col. 1) is also misleading. Since the early 1970s, hundreds of assessments of the potential for adverse environmental impact have been conducted in the United States. If by "tools to monitor . . . and to detect impacts" EPA means sampling techniques, it is mistaken. Basic field sampling procedures used to estimate numbers of organisms entrained or impinged and to describe the seasonal abundance patterns of organisms in the vicinity of the intake are little changed over more than 20 years. What relatively minor differences in field sampling methodologies exist can be attributed largely to differences in site conditions and species involved at each power plant. It is true, as observed earlier in these comments, that scientists' knowledge of fish population dynamics has improved, and so have the predictive models. But that simply means that it is no longer necessary to use the hyperconservative assumptions that were used in early models and that caused impacts to be so often overestimated.

If EPA feels that inappropriate methods have been used in some studies, the appropriate solution would be to issue guidelines warning against using those methods or endorsing others. Doing away with all scientific methods in favor of a simple, across-the-board prescription of flow and velocity is not the answer.

In short, it is true that scientific advances in all areas of population assessment continue to be made, as the wealth of assessment techniques identified in EPRI's Assessment Methods Catalog demonstrates. See EPRI, Catalog of Assessment Methods for Evaluating Effects of Power Plant Operations on Aquatic Communities (TR-112013 1999) (EPRI Assessment Methods Catalog). But the existence of better tools supports the practicability and validity of the site-specific approach.

EPA Response

EPA agrees that advances have occurred with regard to certain environmental assessment techniques. However, as discussed in Section III and VI.B of the preamble to the final rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures must be measured only with a population-based endpoint. Rather, there can be numerous measures of such impacts, including, but not limited to, assessments of fish and aquatic organism impingement and entrainment. See preamble to the final rule.

The two-track approach in the final rule balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. Under Track I, data collection requirements have purposefully been minimized to provide a fast-track compliance alternative.

Improved assessment tools should support the demonstration required under Track II. See 316bNFR.068.018.

Comment ID 316bNFR.068.025

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

As to EPA's assertion that the lack of a uniform regulation creates uncertainty, UWAG agrees with the concern but not with EPA's proposed solution. The need for certainty, in order to allow timely and efficient permitting, is a significant concern, especially for new facilities. In many parts of the country, new capacity is urgently needed. Johnson, K., Experts Fear a Brutal Season for Heating In the Northeast, N.Y. Times, Sept. 11, 2000 at B1; Smith, R., Probe of California Power Prices Begins, But New Plants Aren't Seen as Solution, Wall St. J., Sept. 11, 2000, at A10. That capacity is essential to public safety and welfare and to the stability and growth of the nation's economy. See, e.g., Greenspan, A., Testimony of Chairman on the Federal Reserve's Report on Monetary Policy Before the U.S. Senate Committee on Banking, Housing, and Urban Affairs (July 25, 2000).

But the way to ensure timely permitting is not to issue rigid standards, combined with site-specific study requirements that can be used only as a downward ratchet. Instead EPA should acknowledge the site-specificity of the issues and endorse CWIS technologies that create inherently low risks. It should not require extensive pre-permitting studies for facilities that choose simply to use low-risk technologies.

The steam electric industry, due to the size of its water withdrawals, has been subject to significant §316(b) regulatory controls even without a formal regulation. To the extent there was uncertainty after EPA's 1977 withdrawal of its previous § 316(b) regulations, the subsequent 23 years of § 316(b) application, based on guidance and best professional judgment, have eradicated it. The present system effectively regulates intake structures and is not laden with uncertainty, although many new facilities would benefit from an incentive-based approval process that avoided the need for site-specific study.

EPA Response

The two-track approach in the final rule balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. Under Track I, data collection requirements have purposefully been minimized to provide a fast-track compliance alternative. See 316bNFR.068.018.

Comment ID 316bNFR.068.026

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Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

{Comment is contained within footnote 34 of the UWAG comments. The text to which it refers was not coded.}

The rule itself does not specify whether it requires flows consistent with “wet” cooling or indirect “dry” cooling, but the preamble describes the standard as requiring wet recirculating cooling. 65 Fed. Reg. 49,087 col. 2. EPA nowhere says how one determines that make-up and blowdown are minimized.

EPA Response

As stated in the final rule, flow reduction requirements are commensurate with the level achievable using closed-cycle recirculating "wet" cooling. The optimized makeup and blowdown rates are discussed in response to comment #316bNFR.068.101.

Comment ID 316bNFR.068.027

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Subject Matter Code 12.11

5% Mean Annual Flow

For some of these "performance standards" EPA has identified one or more technologies that it says are capable of meeting the standards. For others (e.g., percent flow) the existence and availability of a technology are absent, or at best implicit.

EPA Response

EPA believes the most reliable and efficient means of reducing cooling water intake flow is the implementation of a recirculating cooling system. These may include installation of cooling towers or cooling ponds or other design considerations. Recent trends in the electric generating industry have show an increase in the use of more energy-efficient technologies, such as combined cycle turbines, which require less cooling water. The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities.

EPA believes the two track approach presented in today's final rule affords cooling water users adequate flexibility in meeting the standards. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

Comment ID 316bNFR.068.028

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Subject Matter Code 2.2

Obligation Under 316(b)

HOW EPA'S PROPOSAL SHOULD BE MODIFIED TO SATISFY BOTH CONGRESS' INTENT AND THE PRINCIPLES OF SOUND FISHERIES MANAGEMENT

EPA has proposed an inflexible rule based on physical characteristics of a CWIS site, using a "littoral zone" surrogate for local biology. "It is important that the [§ 316(b)] regulations have a sound, scientific basis . . . ." Cronin v. Browner, 90 F. Supp. 2d 364, 373 (S.D.N.Y. 2000). The § 316(b) rule should include as an option a process by which permit writers can implement § 316(b) site-by-site, using a stepwise approach that first determines whether a proposed CWIS is reasonably likely to create AEI and, if so, which of the "available" intake structure technologies is "best" for the site, based on benefits and costs.

EPA has, to be sure, acknowledged the importance of site-specific factors, both by dividing waters into four categories and by focusing on the littoral zone. But neither of these measures is sufficient to permit decisionmakers to take into account the many factors, discussed below, that should affect the AEI and BTA decisions.

EPA Response

EPA has rejected the littoral zone concept for the reasons discussed in the preamble to the final rule and in response to comments 316bNFR.056.010 EPA has adopted a two track approach for the reasons discussed in the preamble to the rule and elsewhere in this comment response document.

Comment ID 316bNFR.068.029

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Subject Matter Code 9.4

Adverse Environmental Impact

The First Step Should Be to Determine Whether an Intake Will Cause "Adverse Environmental Impact" (AEI)

The Statute Calls for a Three-Step Analysis

The plain words of § 316(b) call for a three-step decision process: Will there be AEI, what CWIS technologies are "available," and which of them is "best" for the site? Thus, the § 316(b) rule should require that a permit applicant and regulatory agency (1) determine whether a proposed CWIS will have an "adverse impact"; (2) if so, list any technologically feasible choices for location, design, construction, or capacity of that particular intake structure that would minimize the adverse impact; and (3) decide which is the right choice based on cost and effectiveness.

Decisions by both EPA and courts are consistent with this interpretation of the statute. See, e.g., EPA Regional Administrator (Region IV), Initial Decision, In the Matter of Carolina Power and Light Co., NPDES Permit No. NC0007064, slip op. at 28, 44-45 (Nov. 7, 1977) (first inquiry is whether entrainment and impingement create adverse impact); Seacoast Anti-Pollution League v. Costle, 597 F.2d 306, 311 (1st Cir. 1979) (cost clearly an "acceptable consideration" in determining whether the intake design "reflect[s] the best technology available"); In re Public Service Co. of New Hampshire, 10 Env't Rep. Cas. (BNA) 1257, 1261 (Dec. of EPA Adm'r) (June 17, 1977) (§ 316(b) not to be interpreted as requiring use of technology the cost of which is "wholly disproportionate to the environmental benefits to be gained").

EPA Response

Please see responses to comments 316bNFR.014.009, 316bNFR.068.007, and 316bNFR.068.008.

Comment ID 316bNFR.068.030

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Subject Matter Code 9.4

Adverse Environmental Impact

Selecting BTA to Minimize AEI Requires First Knowing What AEI Is

EPA has, in a sense, lumped all three of these decisional steps together by deciding that, if an intake is well outside the littoral zone and the flow and velocity are below specified numbers, AEI (however it may be defined) will be minimized (or more than minimized). And this may be so, given that these flow and velocity requirements are likely to be significantly overprotective in many cases, as we show below. But it is impossible to justify a rule for minimizing AEI that never bothers to say what AEI is. Instead, EPA acknowledges that its proposal does not define AEI but says that it may adopt one of the six alternative definitions discussed in the preamble (including the "1% of organisms susceptible to the CWIS" and the "one fish" definitions). 65 Fed. Reg. 49,074-75.

UWAG submits that the development of a sound narrative definition of AEI is a necessary first step in the rulemaking process and must be done before technology options can be evaluated. To be sure, it would be acceptable to offer, as an option, a preapproved technology solution so conservative that it would protect the environment at most sites regardless of local conditions. For instance, EPA could develop a framework that allowed permittees to choose to install one or more technologies that EPA assessments show are highly protective, or even over-protective, almost anywhere it is used. A permit applicant who agreed to use that technology or technologies would be deemed to satisfy § 316(b), just as EPA has proposed a de minimis cooling water user would. Other applicants could follow the path of site-specific assessment and BTA determination described elsewhere in these comments. But EPA's proposed rule is not an incentive-based option of this kind; it is a universal requirement.

In the past EPA has acknowledged the importance of identifying AEI. EPA's preamble to its original § 316(b) regulations makes this very point:

The statute directs the Agency to insure that enumerated aspects of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts. Once such adverse effects have been identified (or, in the case of new structures, predicted) then the effort must be to select the most effective means of minimizing . . . those adverse effects.

41 Fed. Reg. 17,387, 17,388 (Apr. 26, 1976) (emphasis added). The same preamble recognizes the need to consider many factors to decide if there is adverse impact:

[T]here are many factors that should be considered when determining whether an adverse impact exists or is likely to exist. The factors noted by the commenters [i.e., damage to the aquatic ecosystem] are among those to be considered. All pertinent factors, rather than reliance on a single factor, should receive adequate consideration.

Id. at 17,389; see also Decision of EPA Region I Administrator, In re Pilgrim Nuclear Station Units 1

& 2 (March 11, 1977) (outlining six factors for determining adversity).

EPA's § 316(b) Development Document also acknowledges that the first step in § 316(b) analysis is to identify whether there is adverse environmental impact:

If a significant adverse environmental impact is identified, the applicant should be required to develop a recommended plan of action to minimize the impact with alternatives along with estimates of the results anticipated. It is useful to note that the statute and the regulations require only that adverse environmental impacts be minimized and not necessarily eliminated altogether.

EPA, Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact, App. B at 222 (April 1976) (Development Document) (emphasis added) (DCN:1-1056-TC). This language is more authoritative than the usual guidance document, because the §316(b) rules explicitly incorporated the Development Document as part of the rules:

The information contained in the Development Document shall be considered in determining whether the location, design, construction, and capacity of a cooling water intake structure of a point source subject to standards established under Section 301 or 306 reflect the best technology available for minimizing adverse environmental impact.

41 Fed. Reg. 13,787, 13,780 (Apr. 26, 1976). These early EPA statements are truer to the meaning of the statute than the newly proposed § 316(b) rule.<FN 35>

Footnotes

35 EPA is allowed to change its mind, of course, though it needs a good reason for doing so. Under well-settled doctrine, an agency interpretation that conflicts with the agency's earlier interpretation is entitled to "considerably less deference" than a consistently held agency newfound view. Immigration and Naturalization Service v. Cardoza-Fonseca, 480 U.S. 421, 448 (1987); American Mining Congress v. U.S. Environmental Protection Agency, 824 F.2d 1177, 1182 (D.C. Cir. 1987). EPA's newfound position on the meaning of "adverse environmental impact," then, will be given less deference by courts than its original understanding.

In practice, this means that EPA needs a very persuasive reason for departing from past practice. As we show elsewhere in these comments, EPA has not provided such a reason, and we doubt that one exists.

EPA Response

Please see responses to comments 316bNFR.014.009 and 316bNFR.029.013.

Caselaw also supports the proposition that AEI must be identified as a first step. In United States Steel Corp. v. Train, 556 F.2d 822 (7th Cir. 1977), U.S. Steel argued that EPA had failed to apply cost-benefit analysis to the possible retrofit of intake technologies that might be required following its AEI analysis. The court said this argument "comes too soon" because "no particular control methods are required by the permit." 556 F.2d at 850. The court viewed the BTA analysis as a separate one, to be performed after adverse environmental impact studies.

The Region I Administrator also contemplated a stepwise analysis in the Decision of Region I Administrator, Pilgrim Nuclear Station Units 1 & 2 (March 11, 1977):

[I]n the case of § 316(b), EPA must assess the level of environmental impact caused by an intake structure, estimate its magnitude, identify the best technology available to minimize the impact and review the costs of such measures to assure that it is not wholly out of proportion to the protection achieved.

Similarly, the Region IV Administrator decided that one must first decide if there is AEI and then select BTA in Initial Decision, Region IV Administrator, Brunswick Units 1 & 2 (November 7, 1977):

In determining whether a discharger has complied with the requirements of the section, two inquiries are relevant: first, is there an adverse environmental impact; and secondly, if there is an adverse impact, does the location, design, construction, and capacity of the cooling water intake structure reflect the best technology available for minimizing that adverse impact?

Slip op. at 28.

EPA Response

Please see response to comment 316bNFR.014.009.

EPA disagrees with the commenter's view of U.S. Steel Corp. v. Train. The only issue before the Court was whether EPA could require monitoring in U.S. Steel's permit. U.S. Steel had argued that EPA conduct a rough cost-benefit analysis before requiring an impact analysis. The court held that such a requirement was "well within the Agency's section 308 authority." 556 F.2d at 850. There the Court did not hold that the BTA analysis must come after an impact analysis. Rather, the Court said in dicta that EPA will conduct a "limited cost-benefit analysis once the information on which an evaluation of the various technologies can be made becomes available."

Comment ID 316bNFR.068.032

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Subject Matter Code 2.2

Obligation Under 316(b)

A Definition of AEI Is Needed to Focus the Exercise of EPA's Discretion

EPA's authority to impose requirements under § 316(b) depends on its statutory authority to require minimization of AEI. Without a definition of AEI, it is hard to see how EPA can justify any technology requirements. If a CWIS as designed would not create AEI at all, it is outside EPA's §316(b) authority. Simply assuming that AEI will occur, based on broad geographic factors or numbers of organisms entrained or impinged, ignores many facilities that have operated in what would, under EPA's proposal, be "sensitive" areas and yet have not caused AEI.

EPA Response

EPA has explained its interpretation of the phrase best technology available for minimizing adverse environmental impact in the preamble to the final rule. EPA has explained elsewhere in this document and the preamble EPA's basis for interpreting the phrase in a primarily technology-based sense. See response to comment 068.007 and 068.008. While "AEI" includes effects on the population, it also includes impingement and entrainment of organisms. EPA has described in the preamble why for new facilities, it measuring environmental performance for new facilities in terms of impingement mortality and entrainment (Track 2) rather than using a population endpoint. See response to comment 316bNFR.507.004 and Section VI.B.2.c in the Preamble to today's final rule.

Comment ID 316bNFR.068.033

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Subject Matter Code 9.4

Adverse Environmental Impact

Moreover, without a definition of AEI, EPA has set no bounds on its discretion to interpret § 316(b), and that would violate several principles of administrative law, including the Nondelegation Doctrine. The D.C. Circuit has held that EPA must identify "intelligible principles" for determining how statutory terms are to be interpreted. American Trucking Ass'ns v. EPA, 175 F.3d 1027, 1037-38 (D.C. Cir. 1999), cert. granted sub nom. Browner v. American Trucking Ass'ns, 120 S. Ct. 2003 (2000). By the reasoning of American Trucking, EPA must articulate standards for determining what is "AEI" and identify "intelligible principles" for drawing lines between impacts that are AEI and ones that are not. Id. at 1034.<FN 36>

Footnotes

36 Such standards cannot be created by the Agency out of whole cloth; they must be discerned in the statute and legislative history. UWAG does not believe that EPA can find in the Clean Water Act any basis for defining AEI as any impact whatsoever, no matter how small.

EPA Response

Please see response to comment 316bNFR.536.011.

Comment ID 316bNFR.068.034

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Subject Matter Code 21.0

Cost/Benefit Analysis

Finally, EPA's failure to define AEI makes the benefit/cost analysis for the rule (65 Fed. Reg. 49,101-05) highly suspect, as will be discussed later in these comments. See Part XIV below.

EPA Response

EPA disagrees with the comment that the rule imposes a uniform national standard approach fails to adequately consider site specific costs and benefits and thus leads to inefficient results. One of the purposes of the final §316b rule is to address the current regulatory regime which allows for a site specific determination of best available technology. A uniform national standard is needed to address short comings of current practices which are not sufficiently protective and are overly burdensome to permit writers. Moreover, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

EPA further disagrees with the commenter's suggestion that the national standard approach does not allow for consideration of site-specific conditions. For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. Further, the rule establishes technology-based performance requirements, based on a two-track approach. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit applicant to select and implement design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I. Track II also requires the applicant to meet the same proportional flow requirements that apply in Track I. EPA believes that the two-track approach allows for the consideration of site-specific costs and benefits and will ultimately result in the efficient and appropriate application of the best technology available for minimizing adverse environmental impact.

Comment ID 316bNFR.068.035

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Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

"Impact" Means Adverse Effects at the Population or Community Level

We have said that EPA must define AEI. But how should it be defined? UWAG believes that to conclude that harm to even a single fish is sufficiently "adverse" to trigger § 316(b) would not reflect Congress' intent. AEI has to be defined in terms of effects on an aquatic population of an important species <FN 37> or on the aquatic community structure and function, not on individual members of such populations.

The language of the statute does not support the "one fish equals AEI" proposition, for several reasons. First, Congress could have required the minimization of "any" or "all" environmental impacts, but instead it said "adverse" impacts. By this Congress must have intended the Agency to use good biological science to make judgments about what is "adverse." The word "adverse" cannot be ignored, because every word of a statute must be given effect. 2A Sutherland Stat. Const. § 46.06 (5th ed.).

Second, use of the word "environmental" in § 316(b) implies an emphasis on the health of aquatic populations and the aquatic community as a whole <FN 38>, as well as environmental impacts such as fogging from cooling towers. Nothing in the Act or guidance suggests a focus on impacts to each individual fish or larva.

Third, the "one fish equals AEI" definition is inconsistent with the word "minimizing" in the statute. Congress said "minimize" AEI, not eliminate it. If Congress intended to prohibit all environmental impacts, then there would be nothing to minimize. Also, the fact that § 316(b) regulates only cooling water intakes and not process water intakes suggests that Congress did not intend to address impacts at the "one fish" level, because it would be irrational to regulate the impingement of a single fish by a cooling water intake while leaving impingement and entrainment by other intakes (for process water or drinking water) unregulated.

It is true that the draft 1977 guidance for § 316(b) says "[a]dverse aquatic environmental impacts occur whenever there will be entrainment or impingement damage." U.S. EPA, Office of Water Enforcement, Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500 at 11 (Draft May 1, 1977). But the very next two sentences say: "the critical question is the magnitude of any adverse impact. The exact point at which adverse aquatic impact occurs at any given plant site or waterbody segment is highly speculative and can only be estimated on a case-by-case basis by considering the species involved, magnitude of the losses, years of intake operation remaining, ability to reduce losses, etc." (emphasis added). Id. Thus the guidance makes clear that "AEI" is more complex than merely predicting one entrained egg or one impinged fish while ignoring the species and other factors. Most pointedly, the "magnitude of the losses" helps to determine not just the size of the AEI, but whether there will be AEI at all.

Similarly, in the preamble to its 1976 regulations, EPA said that many factors contribute to determining when AEI is occurring, all of which should be considered:

Some commenters recommended that the Development Document should provide that the proper test for minimizing adverse environmental impact is related to damage to the aquatic ecosystem and not to the number of fish and other aquatic organisms killed or damaged.

Section 316(b) requires that the best technology available be used to minimize adverse environmental impacts. As noted in the Development Document, there are many factors that should be considered when determining whether an adverse environmental impact exists or is likely to exist. The factors noted by the commenters are among those to be considered. All pertinent factors, rather than reliance on a single factor, should receive adequate consideration.

41 Fed. Reg. 17,387, 17,389 col. 1 (Apr. 26, 1976) (emphasis added). Thus, EPA's original § 316(b) rules required EPA to consider multiple factors, not merely whether one fish would be affected. (What those factors are and how AEI might be measured are discussed elsewhere in these comments.) Thus the Administrator adopted a population-level concept of adverse impact and recognized the need to consider adult equivalents and multigenerational effects.

Moreover, court and administrative decisions under § 316(b) clearly favor a population-and community-based approach. For example, in upholding a decision by the EPA Region I Administrator, the First Circuit noted that "the . . . Administrator was fully aware that some smelt could be found at the intake location and that juvenile smelt could be entrapped and killed. These facts do not undermine his finding that 'most' smelt will not come near the intake and thus will not be endangered." Seacoast Anti-Pollution League v. Costle, 597 F.2d 306, 309-10 (1st Cir. 1979). Furthermore, in considering the potential impact of the intake on winter flounder, the Administrator found that most winter flounder larvae would be carried out of the estuary on the prevailing tidal current bearing southward (rather than northward toward the intake). Based on this and other facts, the Administrator determined that the potential impacts to winter flounder would not be adverse. The First Circuit Court of Appeals upheld the Administrator's decision, despite the finding that that intake would crop some winter flounder larvae.

Earlier, when the Seabrook case was before the EPA Administrator, in In re Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), 10 Env't Rep. Cas. (BNA) 1257 (June 17, 1977), rev'd on other grounds and remanded, Seabrook Anti-Pollution League v. Costle, 572 F.2d 872 (1st Cir. 1978), the Administrator noted that the loss of Mya clam larvae from all sources related to the Seabrook plant would be about 1x10<exp>11 or 100,000,000,000. Since this was at most about 5% of the standing crop of Mya clam in the area, the Administrator concluded that "[c]onsidering that a single adult clam, which may have a life span of 3-4 years, releases several million eggs per spawning and may spawn several times each year, a loss of this order is not expected to have a significant impact on local populations." 10 Env't Rep. Cas. (BNA) at 1268.

Several decisions of EPA Regional Administrators endorse, implicitly or explicitly, population-based evaluations of AEI. See, e.g., Decision of Region I Administrator, Pilgrim Nuclear Station, Units 1 & 2 (March 11, 1977) (noting that EPA must assess the level of environmental impact caused by an

intake structure, [and] estimate its magnitude (emphasis added) and identify the best technology available to minimize any adverse environmental impact).<FN 39> Thus, EPA has never rejected a population-based approach to AEI. To the contrary, in individual cases, it has adopted just such an approach.

Similarly, the D.C. Circuit, deciding whether the operator of a hydroelectric dam was obligated under the Federal Power Act to pay for gizzard shad and freshwater drum killed or injured by the dam, ruled that it did not, if the rationale was simply preservation for preservation's sake. The key was whether the fish losses had an appreciable impact on the fish populations. If not, entrainment mortality "can hardly be characterized as 'losses' to the fishery." Because gizzard shad and freshwater drum are prolific spawners, a 6-6.5% mortality rate (and even 10% in earlier cases) did not adversely affect the populations. New Martinsville, West Virginia v. Federal Energy Regulatory Comm'n, 102 F. 3d 567, 571 (D.C. Cir. 1996).

The "one fish equals AEI" proposition is unprecedented in the history of environmental protection in the United States. Even for threatened and endangered species, the Fish and Wildlife Service will sometimes permit an "incidental" take of individuals; that is the purpose of incidental take permits under § 10 of the Endangered Species Act. Likewise other environmental statutes, even those that protect human health, base regulatory decisions on assessment of risks. For example, for safe drinking water, EPA sets standards based on a range of risk levels <FN 40>, as it does with primary ambient air standards for pollutants that have no discrete "zero risk" level. <FN 41> If risk assessment is appropriate for protecting human health, then it surely must be appropriate for aquatic communities under § 316(b).

EPA's Ecological Risk Assessment Guidelines, 63 Fed. Reg. 26,846 (May 14, 1998), underscore the Agency's commitment to the use of risk assessment in environmental management decisions, such as § 316(b) determinations. The basic precept of risk assessment is that risks to an endpoint (e.g., an aquatic population) from a stressor (such as a CWIS) should be evaluated, whether quantitatively or qualitatively, to provide input to the environmental manager. The goal of risk assessment is not to eliminate risk but to manage it appropriately, based on the best available science. Thus, EPA's endorsement of ecological risk assessment is inconsistent with the "one fish equals AEI" proposition, which is a presumptive "no-risk" standard.

Finally, there is no evidence that Congress intended to apply an extremely stringent "no risk" or "no loss" standard to cropping caused by CWISs as compared to other sources of fish mortality. It would be irrational and inequitable to treat all entrainment or impingement as "adverse" if caused by users of cooling water, when society routinely accepts (indeed encourages) the use of aquatic resources by others without deeming it "adverse." In the absence of clear Congressional intent to treat power plant cropping differently, such a policy would be unprincipled and insupportable. Thus, a "one fish equals AEI" definition necessarily would put regulation of CWISs out of step with other natural resource management programs that regulate fish harvests, and with other environmental management programs, which allow for adverse effects. A complete disconnect between § 316(b) and existing resource management programs cannot be what Congress intended.

Footnotes

37 Even for threatened and endangered species, for which effects on individuals can be much more important, NMFS and the Fish and Wildlife Service look at effects on populations when issuing biological opinions and incidental take permits.

38 For example, in comments filed with the New Jersey Department of Environmental Protection and Energy (NJDEPE) on a draft permit for the Salem Generating Station, EPA Region III requested that NJDEPE supplement its Fact Sheet/Statement of Basis to assess the costs and environmental benefits of four possible scenarios. The Region said that "the environmental benefits/impacts for each scenario should be presented, in both a quantitative and qualitative manner, which addresses both fisheries and overall Delaware ecosystem impacts." Caspe 1993 (emphasis added).

39 Proponents of the "one fish equals AEI" concept sometimes refer to the Initial Decision of the Region IV Administrator in Brunswick Units 1 & 2 (Nov. 7, 1977). Yet even in that case, the Regional Administrator did not define AEI as the loss of a single fish. What he said was only that an impact need not cause irreversible or irretrievable damage in order to be AEI.

40 C.F.R. Part 141, Subpart B (1997).

41 See American Trucking Ass'ns v. EPA, 175 F.3d 1027 (D.C. Cir. 1999).

EPA Response

Please see responses to comments 316bNFR.507.004 (AEI interpretation/fish population assessments), 316bNFR.014.013 (two-track framework), 316bNFR.040.022 (conceptual basis for AEI from impingement/entrainment losses), 316bNFR.040.004 (ecological risk assessments) and section VI.B.2 of the preamble for today's rule.

A Reasonable AEI Definition and Screening Method

As we have said above, for new sources UWAG thinks the most effective means of regulation would use a site-specific approach, while still giving permit applicants an option of designing their facilities to include inherently low-risk features or technologies identified by EPA and thus avoiding much of the delay often associated with site-specific study. Regardless of which option applies in a given case, it must begin with a reasonable definition of "adverse environmental impact."

EPA could base the definition of AEI on measurable biological endpoints, which would require a significant technical effort, but defining the specific endpoints is not absolutely necessary for this rule. Instead, the rule could include a narrative definition of AEI, along with a list of factors to be considered in determining AEI. This approach would allow site-specific § 316(b) decisions but still ensure a uniform process for determining AEI.

Once AEI was defined, facilities that chose a site-specific approach to determining BTA could use relatively simple, efficient screening criteria to assess whether a proposed CWIS would present little or no risk of AEI. Such screening criteria would not cover all the factors necessary for a full determination that a facility would cause AEI; rather, they would be conservative enough to ensure that facilities satisfying them would present little or no risk of AEI. Where the screening criteria did not put the facility into this low-risk category, the facility could choose to do further studies necessary for a site-specific AEI assessment or proceed directly to assessing alternative technologies.

a. A Reasonable Definition

In line with the above principles, UWAG recommends that "adverse environmental impact" be defined as follows:

Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function and (2) is attributable to the operation of the cooling water intake structure.<FN 42>

Because this definition is drawn from scientific principles fundamental to natural resource management, it can be interpreted using the same concepts and analytical techniques used by fisheries scientists and resource managers.

For example, the "representative indicator species" (RIS) should be selected from species that are listed for protection or management, particularly vulnerable to entrainment or impingement at the site in question, or especially important to the aquatic community, either directly as commercial or recreational species or indirectly as playing some important role in the community structure and

function (such as necessary food for another important species). The purpose of choosing an "indicator" species, of course, is to protect not just that species but rather the aquatic community of which it is "representative." When a threatened or endangered species is selected as a RIS, even a small number of individuals may be of concern, and here the evaluation of the risk should be consistent with the programs already established under the Endangered Species Act.

The proposed definition turns on "unacceptable risk." What risk is "unacceptable" is a function of a number of biological and social factors, which must be managed through a scientific risk assessment and risk management process.

Footnotes

42 Although this definition would apply to both new and existing facilities, we do not mean by offering it to prejudge any issues in the future § 316(b) rulemaking for existing facilities. Limiting the definition to effects attributable to the operation of the CWIS would not preclude the operator of an existing plant from doing a community-level or population-level study to assess directly the health of the aquatic community for § 316(b) purposes. If no AEI was found in the source waterbody, the requirements of § 316(b) would be satisfied. Without this limitation, arguably operators of CWISs could face the unreasonable expectation of having to minimize AEI caused by factors beyond their control.

EPA Response

Please see responses to comments 316bNFR.069.008, 316bNFR.014.013, and section VI.B of the preamble to today's rule.

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Subject Matter Code 9.44

Request for Comment: Definition of AEI

Application of Natural Resource Management Approach
(i) Maximum Sustainable Yield

One of the most important resource management concepts that should apply to the interpretation of AEI is "maximum sustainable yield" (MYS) as developed under the Magnuson-Stevens Fishery Conservation and Management Act. See Part III.F. above. Fisheries scientists have developed a variety of methods for estimating (1) the level of mortality that can be imposed on a fish population without threatening its capacity to provide MSY on a long-term basis and (2) the optimum population size for maintaining MSY. Because entrainment and impingement are forms of harvesting, which (upon conversion to equivalent adults) are analogous to fishing, the methods used by fisheries scientists to evaluate the impacts of proposed harvesting regimes also can be used to evaluate the potential impacts of CWISs.

(ii) Accepted Fisheries Management Predictive Tools Appropriate for New Facilities

Many of the methods of predicting fish losses that have been used in § 316(b) demonstrations are direct applications of commonly used fisheries management tools, including:

*Lost Reproductive Potential
*Exploitation Rate
*Conditional Mortality Rates
*Age/Cohort-Structured Models (e.g., RAMAS®)

These approaches, and others as well, are documented in the EPRI Assessment Methods Catalog.

Although many of these methods were developed for fisheries management, there is no reason not to use them for power plant impacts. As demonstrated in Appendix B, the compensatory processes that permit harvested fish stocks to sustain high levels of fishing mortality operate in all fish species, not merely harvested ones. Hence the methods used to assess impacts of mortality on harvested species will work just as well for non-harvested species.

EPA Response

Although EPA agrees that tools such as estimating Maximum Sustainable Yield (MSY) can be useful for managing adult fish, EPA questions the relevance of such approaches when evaluating egg, larvae, and juvenile losses associated with cooling water intakes. EPA also notes that the models used to estimate MSY do not directly incorporate additional stressors other than fishing pressure, fisheries are often managed based on their optimum yield (a value less than the MSY), and fisheries experts acknowledge that there is a high degree of uncertainty associated with managing fish populations (see

response to comment 316bNFR.507.004 and today's preamble section VI.B. 2.c). Finally, EPA considered the relative success of ongoing fishery management efforts implemented by NMFS and others. In particular, EPA considered that despite a long history of managing our national fisheries and the availability of state-of-the-art fish population models, NMFS recently classified 34% of their managed stocks as overutilized. Thus, given the high degree of uncertainty associated with managing fisheries, EPA supports the conclusions of a recent NMFS advisory panel that "The modus operandi for fisheries management should change from the traditional mode of restricting fishing activity only after it has demonstrated an unacceptable impact, to a future mode of only allowing fishing activity that can be reasonably expected to operate without unacceptable impacts." For these reasons, along with the time it takes to use such tools, EPA has not employed this approach for measuring performance in today's rule for new facilities.

Screening Criteria

UWAG suggests that the types of stock assessment methods discussed above may be efficiently incorporated into a screening approach for evaluating the potential impacts from new facilities. Information needed to use fish stock assessment models may be unavailable for new facilities, but it may still be possible to identify facilities that have little or no potential to affect the sustainability of fish populations. This "screening approach" would require little site-specific data.

Key characteristics that can be used to screen out facilities that will create little or no potential for AEI include these:

*The location of the proposed intake structure relative to important aquatic habitats (not just the "littoral zone"),
*The fraction of the flow or volume of the waterbody that will be withdrawn each day (a cooling system factor rather than an intake structure one, but one that might be used for screening purposes nevertheless),
*The design of the facility, and
*The life histories and spatio-temporal distributions of potentially vulnerable species.

See Appendix B to these comments. Conservative screening criteria can be established using these characteristics (and perhaps others) that would distinguish between intakes that might cause adverse impact and should be analyzed further, and those that are unlikely to cause AEI. UWAG recommends that these criteria be used, at the permit applicant's option, to avoid extensive data collection and analysis, as explained below.

As EPA says in its preamble to the proposed rule (65 Fed. Reg. 49,075), UWAG is developing a screening method for determining whether AEI is likely to occur and, if so, selecting BTA. The comment period for the proposed rule has not allowed sufficient time for peer review of this UWAG proposal, but we can present a preliminary outline of the screening process here.

Screening criteria could be set so as to identify those sites and CWIS designs that will crop no more than a certain specified percentage of the population <FN 43> of given Representative Indicator Species (RIS) <FN 44>. For example, the goal might be to eliminate from further requirements plants that will crop 5 percent or less of equivalent adults of certain species. (The actual screening number remains to be determined and might be higher than 5%. However, one would expect it to be fairly low because it is a conservative screening criterion. A reasoned assessment of what percentage would actually avoid AEI would depend on site-specific factors and for many sites and species would be considerably higher than 5%.) Predictive models such as those in the EPRI Assessment Methods Catalog would be used to determine whether the specified target would be met.

For most facilities, some monitoring, tailored to the site, would be required to confirm that no more than the specified percentage was actually being cropped each year.

Footnotes

43 While we refer here to adults, if a facility did not wish to or could not collect information sufficient to do an equivalent adult analysis, it could always choose to make conservative assumptions.

44 The concept of "Representative Indicator Species," as we refer to them here, recognizes that not all aquatic species in a facility's zone of influence need to be studied in order to gain an understanding of the facility's potential for impact. In consultation with its regulators, the permittee should identify a group of species that will be representative of the community as a whole. Depending on best professional judgment about the intake's potential impact (e.g., whether benthic or pelagic organisms will be most affected), the grouping should include representatives of commercial and recreational fishery species, forage base species, and any threatened and endangered species.

EPA acknowledges that the concept of representative species is a plausible alternative to studying the entire ecosystem. The Source Water Baseline Biological Characterization of the proposed rule requires identification of (1) up to 10 species "most important in terms of significance to commercial and recreational fisheries and the forage base" and (2) all threatened and endangered species potentially susceptible to impingement and entrainment. 65 Fed. Reg. 49,120. The concept is also consistent with EPA's Draft 1977 Guidance, p. 33.

EPA Response

EPA, in this new facility rule, is using impingement and entrainment reduction for determining the standard for minimizing AEI due to the speed and certainty of this approach as compared to the approach suggested by the commenter (specified percentage of population cropped). EPA is concerned about the amount of time and data required to accurately assess aquatic organism effects at the population level (see response to comment 316bNFR.507.004 and preamble section VI.B.2.c.) Today's technology-based rule seeks to minimize impingement and entrainment impacts using a two-track framework. Under Track I of today's rule, all intakes will be subject to the technology-based performance standards that minimize entrainment and impingement. Should a facility choose to follow Track II of today's rule, they can show that site-specific conditions and/or applied technologies will allow them to achieve a level of reduction in impingement and entrainment comparable to the level achieved under Track I. Thus, today's rule provides flexibility while ensuring that all applicants reduce impingement mortality and entrainment to the levels achievable by meeting the technology-based performance requirements of Track I.

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Subject Matter Code 9.44

Request for Comment: Definition of AEI

A Logical Screening Process For Making Risk-Based Initial Determinations

One viable screening process would pass the facility through a series of tests, each designed to screen out facilities that would not crop more than the specified percentage of any Representative Indicator Species. If at any stage the facility was determined not to be likely to crop more than the target percentage, it would drop out, be deemed not to cause AEI, and require no further study or technology, except possibly some operational monitoring. Some steps in the screening process require Representative Indicator Species and predictive models such as those in the EPRI Assessment Methods Catalog. These would be chosen by the permitting agency and the permit applicant working together, and the result would be subject to public comment.

To determine whether the facility would crop less than the target for any RIS, the applicant would have to examine some of the factors discussed in UWAG's Narrative Factors Report (Appendix C to these comments). The applicant could evaluate in turn the following factors:

Locational Risk. The first step would be to look at where the CWIS would be located. If the applicant proposes to locate the intake in an area of poor water quality or other habitat features that cannot support impingeable and entrainable organisms, the facility would be assumed to satisfy the goal. If not, the decisionmaker would move to the next decision point.

Surface Waterbody Volume Use Risk. Next would be the facility's flow requirements. If closed-cycle cooling is proposed for the new facility and less than the targeted percentage of the appropriate instream flow <FN 45> will be used during the period in which entrainable life stages of each RIS are present (using a denominator appropriate for the waterbody type),<FN 46> then the protection goal for entrainable organisms would be met and entrainment would no longer be an issue.<FN 47> The applicant also would have to verify that there were no localized spawning areas near the intake.

Facility Design Risk. Depending on the outcome of the previous decision, at this point there might still be concern about entrainment of one or more particular species. Proposed CWIS entrainment design mitigation features would be considered next to determine if there was a risk that the specified protection goal for adult RIS might be exceeded. For example, a facility might need to use 20% of the river flow but decide not to use biocides and to employ pumps that enhance survival, resulting in 80% survival of entrained organisms. Even though the threshold for flow use was exceeded, design features that result in a high survival of entrained larvae could still achieve the specified goal.

Aquatic Population Risk. The final step in the decision process would consider RIS biological or life history information to determine if there is a risk from entrainment or impingement that would exceed the protection goal. For example, if after examining the first three risk factors it was determined that there was a RIS that faced a 10% population cropping risk, the facility could conduct site-specific studies to explore whether other factors would reduce the risk. For instance, a behavioral factor (e.g.,

diurnal migration to the substrate during daylight hours such that no entrainment occurs during the day) could reduce the population mortality estimate by 50%, making the risk (for this example) only 5%.

If a facility passed through the above screening process and was not able to satisfy the low cropping criterion of a RIS, then it would have two choices. It could undertake a full-fledged site-specific risk assessment/risk management study. Or it could choose to install a preapproved technology, prescribed by the rule, so conservative that it would protect aquatic communities under any circumstances likely to be encountered.

Footnotes

45 UWAG does not believe that assuming that all withdrawals will occur at design low flows is reasonable or necessary. But some reasonable analysis of the potential for impact at low flows could be done.

46 For purposes of making this percentage assessment, one must start by defining the size and extent of the potentially affected waterbody. For some waterbodies, such as lakes and reservoirs, the geographic extent of the waterbody is clear, but factors such as normal pool level may need to be assessed. Other factors that may figure into assessment of the size and extent of the waterbody include the presence and operation of manmade barriers to fish migration, the extent and patterns of fish migration, and typical flow conditions. EPA may choose to develop guidance defining the size and extent of waterbodies.

47 EPA says that assuming uniform distribution of organisms within the waterbody is a conservative method of gauging the likelihood of entrainment effects. EEA, p. 11-3. Thus, at some sites, actual entrainment would be much lower than EPA assumes for purposes of its analysis.

EPA Response

Please see response to comment 316bNFR.068.038.

With respect to aquatic population risks, EPA has some concerns about population-level assessments (please see response to comment 316bNFR.507.004 and the preamble to the final rule).

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Subject Matter Code 9.44

Request for Comment: Definition of AEI

Nuisance Species Should Be Excluded

Exotic species that are regarded as a "nuisance" should be given special consideration in § 316(b) decisions. Certain exotic species, such as zebra mussels, are highly invasive and offer no commercial or recreational benefit. Entrainment or impingement of these species should not be considered an adverse impact.

Other species, such as common carp or the Asiatic claim, may be viewed as nuisance species by natural resource managers for some state waters. In such cases, again, entrainment and impingement should not be regarded as a problem.

Carp eggs and larvae, along with gizzard shad, are the primary ichthyoplankton taken at some cooling water intakes. Both species broadcast eggs widely and rely on large numbers of offspring to offset high mortality rates. Zebra mussels and Corbicula (Asiatic clam) can also be entrained in great numbers. At least one utility has problems entraining and impinging an exotic snail (the Chinese or Japanese Mystery Snail), which was introduced to the United States as a food source in California and more recently for use in aquariums. The snails can clog condenser cooling water tubes and are taken in significant numbers. Given state fishery resource managers' often extensive efforts to get rid of these species and EPA's own express concerns about their effects, cropping by CWISs should not be considered "AEI."<FN 48>

Footnotes

48 EPA has warned about the problem of exotic species. See "How Exotic Species Threaten Rivers, Streams, and Lakes," http://www.epa.gov/ceisweb1/ceishome/atlas/ohiowaters/threats/how _exotic_species_threaten_rive.htm; J. H. McCormack, National Center for Environmental Research, Office of Research and Development, USEPA, "Aquatic Ecosystem Vulnerability and Responses to Invasion by an Exotic Species: Similarities and Contrasts between Ecosystems, Communities, and Species Responses to the Introduction of a New Species of Fish" (undated), http://es.epa.gov/ncerqa/devel/rrap/mced/vulnerab.html.

EPA Response

Please see responses to comments 316bNFR.516.020 and 316bNFR.062.026.

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Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Some of EPA's Suggestions for Defining AEI Are Unsatisfactory, and Others Require Further Refinement

EPA lists five alternative approaches for defining AEI or determining a threshold of adverseness. 65 Fed. Reg. 49,074-75. EPA's stated intent (65 Fed. Reg. 49,074) is to define AEI as "a level of impingement or entrainment of aquatic organisms that is recurring and nontrivial." EPA has not, however, provided a context for deciding what is "nontrivial." In absolute terms, a million entrained eggs or larvae may seem like a nontrivial number. But from a biological perspective, this much entrainment could represent the eggs or larvae produced in a year by a single female fish. See Part VIII below.

Some of EPA's alternatives are said to be derived from EPA's approach to establishing water quality standards. But entrainment and impingement are not analogous to toxic chemical releases, and so it is inappropriate to apply a toxicity minimization approach to regulating CWISs. Comments on each of EPA's alternatives are provided below.

EPA Response

Please see response to comment 316bNFR.040.003 and section VI.B.2.a of today's preamble for discussion of EPA's interpretation of AEI.

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Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

1% Threshold

One of the alternatives would define AEI as the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area, as determined in a one-year study. 65 Fed. Reg. 49,074 col. 2-3. EPA considers the 1% threshold a reasonable means to protect about 99% of the organisms in the water column under the influence of CWISs. 65 Fed. Reg. 49,074 col. 3. EPA regards this as consistent with its water quality-based regulatory programs.

This one percent threshold has no rationale and no scientific basis, at least none that is stated in the preamble or apparent from the record. In the first place, the 1% definition makes no reference to the size of the source waterbody relative to the intake flow, or to the time interval for calculating the percent of water withdrawn. As written, the definition is unbounded because, given enough time, 100% of the volume in the withdrawal zone of an intake structure will be withdrawn. It is particularly objectionable when applied to eggs and larvae without considering conversion to equivalent adults.

In the second place, the alleged connection with the water quality standards program is unexplained. Elsewhere (in the flow limits for streams and rivers) EPA uses a protection level of 99% of the "aquatic community," which is different from 99% of the organisms in the nearfield area, different from a 99% confidence level, and different from dividing by 2 a Final Acute Value intended to protect 95% of genera (which the Agency uses when it sets water quality criteria guidance values). <FN 49>

A water quality criterion designed to protect 99% of the species in an entire waterbody (even if that were the standard EPA applies in its water quality program) is different from a criterion designed to apply to the portion of a waterbody within the influence of a cooling water intake. The concept of a protection level inherent in an ambient standard for toxic chemicals is different conceptually from a technology requirement designed to protect organisms from entrainment and impingement. This 1% value also has no relevance from a natural resource management perspective. Thus, there seems to be no basis in logic or biology for a 1% definition.

Footnotes

49 Even if EPA's reference were accurate and clear, it also ignores the fact that EPA and the states have recognized the need for mixing zones or "zones of initial dilution" where criteria are not met. See 40 C.F.R. § 131.13 (1999). The principle of mixing zones is that a limited area of exclusion or effect will not adversely impact the aquatic community as a whole. Here EPA proposes exactly the opposite approach and considers the nearfield – the limited area within which any effect could occur – as the only relevant gauge of impact.

EPA Response

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, today's rule does not interpret AEI in this fashion. Please see response to comment 316bNFR.029.013 and section

VI.B.2.a of the preamble for today's rule for EPA's interpretation of AEI.

Comment ID 316bNFR.068.043

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Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

1977 Draft Guidance

The second alternative would be to use the definition in EPA's 1977 Draft Guidance. AEI would be defined as impingement and entrainment, and the key inquiry would be an assessment of the magnitude of such effects. 65 Fed. Reg. 49,074 col. 3.

As UWAG has said, not just any impingement and entrainment are "adverse environmental impact," and this second alternative would be objectionable if interpreted to mean "one fish equals AEI." Nevertheless, an approach that followed the 1997 Guidance, so long as it did not assume that every environmental impact was "adverse," might be acceptable, if it involved a hard look at the impacts of entrainment and impingement at a particular site and their effect on the aquatic populations and community rather than on individual animals.

Also, the decision criteria should consider the losses from the resource management perspective. For example, criteria for impacts on harvested species could be established with reference to the jeopardy standards defined by NMFS and other fisheries management agencies. Analogous approaches and criteria could be developed for non-harvested species such as forage species.

EPA Response

Please see response to comment 316bNFR.029.013 (AEI interpretation), 068.037 (MSY and other fisheries management tools), and section VI.B.2 of today's preamble for further discussion of AEI issues.

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Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

One Fish Does Not Equal AEI

Under the third alternative, EPA would consider AEI to occur whenever an organism is entrained or impinged. EPA justifies this proposal by referring to (1) the State of New York's policy that any degree of entrainment or impingement necessarily diminishes public resources and (2) EPA's approach to developing water quality criteria.

This proposal appears designed to impose the most stringent requirements on every facility, regardless of its potential for reducing the abundance or productivity of vulnerable species. As UWAG has said above, "one fish equals AEI" is not justified by the statute, and the analogy to water quality standards lacks a rational basis.

EPA Response

Please see response to comment 316bNFR.029.013 and section VI.B.2.a of the preamble to today's rule for discussion of EPA's interpretation of AEI.

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Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Reference Sites

Another of EPA's alternatives would be to define adverse environmental impact in relation to "reference sites" for the type of ecosystem in which the facility proposes to locate a CWIS and to evaluate the projected impact of the intake structure on the abundance, diversity, and other important characteristics of the aquatic community that would be expected to inhabit the site. 65 Fed. Reg. 49,075 col. 1. This, EPA says, would be analogous to its recommended approach for the adoption of biocriteria into state water quality standards.

Apparently the concept here is to use other sites as benchmarks to define what a site is like when it does not have AEI, then predict whether the site for the new facility, once the CWIS is operating, will have a significantly less-healthy aquatic community than the reference site. It may be intended for use where the proposed site of the new CWIS is already impaired to some extent.

EPA does not explain, though, why it would be more informative to compare the site of the future CWIS, as is expected to be influenced by the CWIS, to some different place than to compare it to the same site today, uninfluenced by the CWIS. The best "reference" site would seem to be the selected site before the CWIS is built. And § 316(b) does not give authority to require cooling water users to try to achieve the environmental conditions at some distant site.

Moreover, using a reference site to define AEI is not technically feasible, because the impacts of CWISs on the metrics used to define biocriteria (e.g., relative abundances of forage vs. predator fish or of different taxonomic groups of benthic invertebrates) cannot be reliably predicted. And biocriteria derivation methodologies do not yet exist and may never be feasible for certain waterbody types, such as estuaries and oceans. So, to the extent scientifically sound, validated biocriteria have been developed by a state, they would be useful, if at all, only for assessing existing facilities.

EPA Response

Please see response to comment 316bNFR.056.031.

Comment ID 316bNFR.068.046

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Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Focus on Certain Species and Community Integrity

Another alternative proposed by EPA is to define AEI with a focus on (1) protection of threatened, endangered, or otherwise listed species; (2) protection of socially, recreationally, and commercially important species; and (3) protection of community integrity, including structure and function. This proposal is akin to the concepts laid out in EPA's Guidelines for Ecological Risk Assessment (EPA 1998).

The three above-cited protection goals are, in the language of the Guidelines, "Management Goals." For each of them, the Guidelines state that EPA must specify Assessment Endpoints and Measures of Effect. For example, appropriate Assessment Endpoints corresponding to Goal 2 (protection of socially, recreationally, and commercially important species) would include the number of young-of-the-year fish produced by the source waterbody or the biomass of the adult spawning stock. Measures of Effect associated with these Assessment Endpoints would be the reduction in young-of-the-year abundance or spawning stock biomass attributable to the CWIS. For each Measure of Effect, EPA would then specify the magnitude of the predicted or measured reduction that would be considered to be adverse.

UWAG believes that such an approach is technically feasible and could, with appropriate stakeholder input, provide the basis for a fair and rational approach to defining and measuring AEI.

EPA Response

EPA agrees with the three areas of focus for AEI as cited by the commenter. Note that these three areas are included in EPA's interpretation of AEI under today's rule. Please see responses to comments 316bNFR.029.013 and 316bNFR.040.004.

Comment ID 316bNFR.068.047

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Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

Balanced Indigenous Population

Finally, EPA requested comment on whether the § 316(a) standard of "protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife" should be applied to § 316(b). UWAG believes that this definition would be workable and consistent with the goal of ensuring the sustainability of populations susceptible to entrainment and impingement. Guidance would still be needed, however, on how the standard should be applied to specific types of waterbodies and populations. In essence, the § 316(a) standard is a management goal similar to the goals discussed above under Alternative 5.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.008, and the preamble to the final rule.

Comment ID 316bNFR.068.048

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Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Consideration of Non-Aquatic Environmental Impacts

In addition to the above specific proposals, EPA invited comment on whether AEI should be defined more broadly to consider nonaquatic adverse environmental impacts. 65 Fed. Reg. 49,075 col. 2-3. Examples include the salt drift from wet cooling towers and the various impacts (e.g., greenhouse gas emissions, resource extraction, and solid waste disposal) associated with the increased electricity production needed to offset reduced generation efficiency.

UWAG believes these types of impacts can and should be considered before implementing a rule that would force new facilities to reduce water withdrawals far below the level required to protect the sustainability of susceptible populations and the integrity of biological communities. Before "BTA" is selected, alternative intake technologies should be evaluated based on assessments of the full life-cycle environmental impacts of those technologies, not merely on the direct costs of construction and operation.

EPA Response

See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Comment ID 316bNFR.068.049

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Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Determining BTA

Once AEI has been defined in the rule, if AEI is occurring or reasonably likely to occur at a site, then the permittee should consider what CWIS technology is the "best available" for that site. (If there is not likely to be any AEI, then AEI has by definition been minimized and the proposed CWIS is BTA.) EPA has chosen in its proposed rule to require flow volume and velocity restrictions nationwide, according to waterbody type and location relative to the "littoral zone" but without regard to local biological information. This is neither consistent with the words of § 316(b) nor scientifically defensible, for several reasons.

First, the assessment that AEI will occur for a given Representative Indicator Species or community integrity and an understanding of how and why it will occur are crucial information for selecting BTA. It would be poor decisionmaking to ignore site-specific information assembled to address the AEI determination and require a single technology that may or may not minimize AEI at a particular site. <FN 50> Instead, selection of BTA (assuming the permit applicant has not chosen the conservative screening approach) should start with a consideration of the site-specific factors responsible for AEI, which must be well understood before a technology can be selected.

Second, it is simply not possible to choose a one-size-fits-all intake structure technology that is BTA for all CWISs in every possible environmental setting. Rather, different technologies may be beneficial or detrimental to different species or life stages and may vary widely in feasibility, performance, and cost, based on many site-specific factors. Here, by way of example, are some of the site-specific factors that should be considered in making a BTA selection:

Waterbody Factors
* Physical and chemical characteristics: salinity, salinity distribution, substrates, nutrients, pollutant loads, natural debris loadings, turbidity, temperature, dissolved oxygen levels
* Meteorological characteristics: icing, prevalence of major storms, water level fluctuations
* Hydraulic characteristics: bathymetry, tides/turnover/ upwelling, river/waterbody flow volume, river/waterbody flow velocity

Biological Factors
* Individual species characteristics: fecundity, life history, habitat preferences, behavioral patterns, presence of natural predators, role of species within the overall ecosystem
* Location of the CWIS in relation to important migratory routes or spawning/nursery areas
* Individual species impingement/entrainment survival rates

Plant-related Factors
* Current configuration of the intake in relation to the waterbody
* Likelihood of sedimentation build-up in front of intake

* Maintenance/repair needs for all parts of intake structure
* Physical feasibility of BTA candidate technologies <FN 51>
* Useful life of plant
* Operational patterns/schedule, including planned outages
* Aesthetic concerns

In light of this complexity, UWAG suggests the following basic framework for selecting BTA: First, in consultation with the permit writer, the permittee should use information on Representative Indicator Species (RIS) to identify those demonstrated, commercially available CWIS technologies that are likely to reduce appreciably the effects of the CWIS on the RISs. Second, the permittee should eliminate any of the candidate technologies that are not "available" for the site in question because of site or operational constraints. UWAG's expert, Edward Taft, has prepared an overview of the process typically used for assessing potential BTA technologies. See Appendix J. That same process could be applied in steps one and two. Third, for the remaining candidate technologies, the permit writer and permittee should evaluate the performance and cost of each technology.

Where the permit writer and permittee agree that a technology or suite of compatible technologies clearly would minimize AEI to the RIS and the permittee agrees that the cost makes that technology or technologies the "best available," the selected technology would be BTA. If the permit writer and the permittee could not agree, the permittee could prepare a benefit/cost analysis to identify the option that was, both economically and environmentally, the "best available." UWAG believes that, to be the best available, an intake technology should maximize the net benefits. <FN 52> The option or suite of options that satisfies this requirement is BTA.

Footnotes

50 Indeed, in many cases, there is more than one technology appropriate for minimizing AEI, and new technologies are continually being developed. EPA should not construct a rule that acts as a disincentive to creative new approaches or to research and development.

51 Physical characteristics of the environment may make impossible, or at least weigh against, a certain technology. For example, the facility may not have sufficient space to install some CWIS configurations, or natural debris loading may make wedge-wire screens impractical, or local meteorology (storms or ice) may prevent efficient use of barrier nets. See EPRI Technology Review, pp. 2-5, 2-21.

52 In the Guidelines for Economic Analysis of Fishery Management Actions published by NMFS, most recently revised August 16, 2000, NMFS advises that "agencies should select those [regulatory] approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach." NMFS 2000b; 65 Fed. Reg. 65,841 col. 3 (November 2, 2000) (notice of availability of Guidelines).

EPA Response

See Section III of the preamble to today's rule and elsewhere in the comment response document for information on why EPA is not defining AEI in the rule or taking the approach suggested by the commenter for new facilities. The commenter's approach is very time consuming and could likely lead to delays in permitting new facilities. EPA has interpreted AEI in the preamble to the final rule and in response to comment 316bNFR.029.013.

See response to comment 316bNFR.008.007 for information on why EPA is not adopting a case-by-

case approach for today's rule. EPA recognizes that the methods or indicators mentioned by the commenter have been used in past permitting decisions, however, EPA is choosing to not explicitly include them in today's final rule. However, inherent to the two-track approach adopted by EPA is a consideration of site-specific factors. This rule was specifically written to allow site-specific determinations by the facility itself as to which technologies would be most appropriate based on their knowledge of conditions at the facility and in the waterbody to represent best technology available for minimizing adverse environmental impact.

Comment ID 316bNFR.068.050

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Subject Matter Code 9.3

Documentation of I & E Impacts

EPA's Assumptions that Widespread AEI is Occurring and that the Rule Will Provide Substantial Environmental Benefits Are Incorrect

In the preamble to its proposal, EPA presents information on entrainment and impingement levels and other environmental effects at a handful of existing baseload power plants (six in all) and suggests that this information demonstrates that substantial AEI attributable to CWISs is occurring nationwide. 65 Fed. Reg. 49,073-74. EPA also uses similar information from an equally small number of facilities (five in all, two of which are the same plants it uses to demonstrate the existence of AEI and one of which is a hydroelectric facility) to illustrate the purported "benefits" of its proposed rule. 65 Fed. Reg. 49,104-05. For the reasons discussed below, these examples do not support EPA's conclusions. Appendix I to these comments explores in detail the significant § 316(b) histories of the cited facilities and refutes EPA's conclusions. The following discussion highlights the major flaws in EPA's analysis.<FN 53>

Implicit in EPA's presentation of the alleged problem of CWIS effects and the anticipated benefits of the rule are a number of assumptions, including that:

(1) Entrainment and impingement values are equivalent to mortality values (65 Fed. Reg. 49,072 col. 1) (they are not);
(2) The impacts cited are attributable to entrainment and impingement in all cases, without the need to distinguish habitat modifications and other non-CWIS effects (65 Fed. Reg. 49,073 col. 1) (they are not);
(3) The existing facilities chosen are representative of "numerous documented cases of impacts" found through EPA's "research of the available literature and section 316(b) demonstration studies" for such facilities (Id.) (they clearly are not);
(4) The effects existing for the five baseload facilities (and one pumped storage project) accurately represent the effects from new facilities of the type EPA says are now being designed, even in the absence of command-and-control § 316(b) regulations (65 Fed. Reg. 49,103-04) (they do not, as EPA itself appears to concede);
(5) The numbers presented provide meaningful information on population effects occurring in each case (65 Fed. Reg. 49,072-73, 49,103) (they do not); and
(6) The numbers presented reflect effects that were not addressed, and will not be, without minimum, uniform BTA requirements of the type EPA has proposed (EEA, p. 11-16) (again, not the case).

As to the first assumption, for several of the cited studies, entrainment and impingement survival is appreciable. For example, recent studies at Brayton Point show that some species survive passage through the cooling system in significant numbers. Winter flounder survival, for example, exceeded 60% in the 1998 sampling season. See Carney 1998, p. 3. Thus, there is substantial evidence that appreciable entrainment survival can occur in open-cycle systems.

Also, an EPRI report due out in December 2000 reviewed 35 entrainment survival studies, over half of which were conducted at plants on the Hudson River (one of EPA's example sites). Some of the results of that report are presented in Appendix H. While survival rates are quite variable, the draft report suggests that survival is high, over 50% for some species. This reality must be factored into any assessment of impacts, as discussed in greater detail in Part VII.E.3 below.

Footnotes

53 In Chapter 11 of the EEA, EPA also presents a number of tables containing ranges of species-specific entrainment and impingement values and mean values for different waterbody types. EPA does not discuss these tables or draw any conclusions from them in the preamble. See Part VIII below for a discussion of the flaws of Chapter 11.

EPA Response

EPA provided information in the NODA on the Hudson and Delaware rivers, two large estuarine systems, documenting significant mortality to aquatic organisms due to cooling water intake structures. EPA also provided documentation of substantial impingement and entrainment occurring on other bodies of water including the Pacific Ocean, the Great Lakes, and the Ohio river to name a few. As pointed out elsewhere in both the Preamble and the response to comments, EPA believes that it has used the best data available. The Agency further maintains that existing and historical studies provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. Moreover, the examples cited by EPA were not meant to predict effects at new facilities, rather they were intended to illustrate that the numbers of organisms impinged and entrained by a facility can be substantial.

The impingement and entrainment numbers documented by EPA were not represented as equivalent to mortality, however, EPA has documented that entrainment rates for selected species and life stages can be as high as 100 percent. Further, cooling water intake structures are one of the many stressors on aquatic communities as identified in section VI.B.3 of the Preamble and EPA has analyses which suggest that more than 99 percent of surveyed existing cooling water withdrawal facilities are located within 2 miles of waters that are identified as impaired or listed by a State or Tribe as needing development of a TMDL. Also, EPA has considered a number of ways in which to meaningfully assess the effects of cooling water intakes and population impacts is but one of these. EPA recognizes that the limitations of existing population models, including models used to manage fisheries, may be related to overall limited understanding of the complexity of aquatic ecosystems. The use of an assessment tool such as population models which typically evaluate the impact on a single species may be inappropriate for assessing impacts on ecosystems. As a final comment on this issue, EPA disagrees with the commenter's implication that only population impacts are meaningful. Population impacts are one of many ways to assess adverse environmental impact from cooling water intakes. Adverse environmental impact includes: impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries, and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function.

With respect to the comment that past studies do not accurately represent the effects from new

facilities of the type EPA says are being designed, even in the absence of command-and-control section 316(b) requirements, the Agency would note that its record shows that there would be more large new facilities projected to use once-through cooling independent of this rule, and these facilities are similar to existing ones using large volumes of cooling water.

For additional information please see Response to Comments 316bNFR.056.005 and 316bNFR.066.008 as well as sections III and VI.B of the preamble.

As to the second assumption, the effects on finfish populations that EPA attributes to operation of the intakes at San Onofre Nuclear Generating Station (SONGS) in fact were not directly linked to entrainment and impingement, according to the same studies EPA cites. Rather, water quality factors associated with discharges from the plant were correlated with the decline. See Appendix I. Thus, the effects EPA cites cannot be attributed to entrainment and impingement.

A second paper, by Dr. Timothy Lohner, entitled "Fish Entrainment, Impingement, and Long Term Monitoring Studies at Ohio River Power Plants" (1998) (DCN:1-3044-BE), examined data on Ohio River fish assemblages from 1981-1997. It showed that populations remained stable over the past 27 years of plant operation and that entrainment and impingement did not prevent increases in abundance and diversity of numerous species.

Also, one of the facilities cited by EPA, the Ludington hydroelectric pumped storage facility, is not a steam electric plant and thus its impacts cannot be representative of entrainment and impingement from steam electric plants or any other facility subject to § 316(b). EPA uses the Ludington facility to "demonstrate[ ] how impingement and entrainment losses of forage species can lead to reductions in economically valued species." 65 Fed. Reg. 49,104. But the comparison of losses from hydroelectric facilities to losses from steam electric facilities is misleading, given the relatively small proportion of a waterbody withdrawn by a CWIS, compared to the enormous throughput of many dams. Moreover, any connection between forage species impacts and impacts to higher trophic level species is waterbody-specific.

EPA Response

EPA does not agree with the commenter that the causative factors for finfish impacts at SONGS is solely related to turbidity and does not agree that this issue has been settled. Please see Response to Comment 316b.NFR.037.001 for additional discussion of this issue.

EPA also does not agree with the commenters assertion that cooling water intakes have had no impact on Ohio River fish populations. EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. Additionally, EPA analyses suggest that more than 99 percent of surveyed existing cooling water withdrawal facilities are located within 2 miles of waters that are identified as impaired and listed by a State of Tribe as needing development of a total maximum daily load (TMDL). This suggests that cooling water intakes may be a contributing factor to existing stresses on water bodies and resident biota.

EPA agrees with fisheries experts and resource managers that there is unavoidable uncertainty associated with managing fish populations. Similar to the difficulty in establishing a nexus between a

stressor and adverse environmental impact, EPA believes that it is difficult to establish a nexus between the alleged stability of Ohio River fish populations and the claim of no effect due to the operation of cooling water intake structures. EPA would note that the information presented by the commenter for the Ohio River could be interpreted to mean that fish populations are improving due to the efforts of other programs such as those which have reduced excess nutrient and toxics loadings, despite the documented mortality related to the operation of cooling water intakes.

EPA does not agree with the commenter that the concept of impacts on forage species and resultant impacts to higher trophic levels is so waterbody-specific that general principles governing energy flow between and among trophic levels do not apply. EPA also disagrees with the commenter that impacts from a hydroelectric pump storage facility cannot be compared to the steam electric facility. Rather, EPA agrees with the comment submitted by EPRI. EPRI stated "the aquatic community does not discern between the water withdrawal use - cooling withdrawals, municipal withdrawals, irrigation withdrawals, hydropower withdrawals, and instream flow withdrawals all have the same potential for an impact on the water body from which the withdrawal occurs." EPA believes that EPRI has made a worthwhile point - that water withdrawals by other facilities, including hydropower facilities can, like cooling water withdrawals, have an impact on the water body from which the withdrawal occurs. Similar to EPRI, EPA believes that hydropower withdrawals are a legitimate analog to cooling water withdrawals.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes and other issues raised in this comment, please see Response to Comments 316bNFR.529.301, 316bNFR.535.034, 316bNFR.056.005, 316bNFR.068.050, 316bNFR.037.001, and sections III and VI.B of the preamble.

As to the third assumption, the examples EPA has chosen, even if they were accurately portrayed, are not representative of widespread effects from the 3,042 <FN 54> existing electric utility facilities in this country. EPA has in the record studies from about 100 plants, yet it has selected only a few examples, many of them with outdated information, to represent the whole industry.

Other examples, including facility reports in the rulemaking record, reveal the bias in EPA's chosen sample. For example, the Tennessee Valley Authority operates 14 steam electric stations in a variety of environmental settings in three states, only one of which was determined potentially to cause an adverse impact.

In a 1998 report entitled "Historical Efficacy of Two Decades of Power Plant Fisheries Impact Assessment in Chesapeake Bay" (DCN:1-3062-BE), William Richkus of Versar (one of EPA's own consultants) reviewed the effectiveness of the site-specific § 316(b) approach for existing facilities. He concluded that "[t]he lack of major power plant impact water withdrawal issues in Maryland over the past decade or so suggests that the approaches developed and applied have satisfied the state's needs and requirements." Id. at 22.

Another paper, by Paul M. Jacobsen et al., entitled "Studies of Cooling Water Intake Effects at Two Large Coastal Nuclear Power Stations in New England" (1998) (DCN:1-3032-BE), reviewed the results of impact assessments at the Millstone Nuclear Power Station in Connecticut and the Seabrook Station in New Hampshire. With respect to Millstone, the analysis showed that fishing pressure was the dominant force shaping the trend in winter flounder abundance. Jacobsen et al. 1998. For Seabrook, where a population-level analysis was not possible, the results indicated that impingement and entrainment were generally lower than at other similarly sized plants, due to its design and site, and that much of the impingement occurred during severe storm events. Jacobsen et al. 1998, pp. 11-12.

Footnotes

54 EEA, p. 3-3.

EPA Response

EPA has stated that the Agency used the best data available and that existing and historical studies provide only a partial picture of the severity of environmental impact associated with cooling water intake structures.

EPA would note that the comment regarding the study on water withdrawals and power plant impacts in the State of Maryland reflects the position of the State of Maryland alone and is not necessarily applicable to a national rule making. It did not take into account the positions of neighboring states. Further, this study focused on the impacts on fishery resources only and did not consider the larger impacts on aquatic communities and ecosystems. As such, this study has limited applicability to a

national rule of the type EPA is crafting.

With respect to the comment on the two nuclear power plants in New England, EPA has never stated that cooling water intakes are the single factor affecting aquatic organism mortality or abundance. Rather, EPA has maintained that there are multiple stressors on aquatic systems and cooling water intakes are but one of the sources of stress. The Agency recognizes that stressors that cause or contribute to the loss of aquatic organisms and habitat may incrementally impact the viability of aquatic resources. Also, many of the stressors which do impact the viability of aquatic resources are subject to national regulations such as effluent guidelines, and today's rule is intended to provide a national rule addressing the stress on aquatic systems from cooling water intakes. Please see Response to Comments 316bNFR.056.005 and 316bNFR.066.008 as well as sections III and VI.B of the preamble for additional discussion of these issues.

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Subject Matter Code 9.3

Documentation of I & E Impacts

As to the fourth assumption, EPA itself says that its analyses show that, even in the absence of § 316(b) regulations, many new facilities are much smaller and incorporate different design features and CWIS technologies than those employed by the existing facilities identified by EPA. See 65 Fed. Reg. 47,908 col. 2. Yet EPA attempts to argue that the "benefits" of this rule should somehow be calculated based on effects from existing facilities.

EPA Response

The commenter points out that new facilities are likely to be smaller and incorporate different designs than existing facilities, and that it is therefore inappropriate for EPA "to argue that the benefits of this rule should somehow be calculated based on the effects from existing facilities." EPA agrees that many new facilities may differ in important ways from existing ones. EPA disagrees, however, that it has argued that the benefits of the new facilities rule should be based on existing facility impacts.

As clearly noted and acknowledged in Chapter 11 of the EEA, "EPA was unable to conduct a detailed, quantitative analysis of the proposed rule because much of the information needed to quantify and value potential reductions in impingement and entrainment at new facilities was unavailable" (EEA, p 11-1). As indicated in the response to comment 316bNFR.068.142, the EEA then proceeds to detail the types of information that would be required to do the analysis for new sources. The EEA also offers some illustrative examples using data that are available to provide examples of potential benefits based on site-specific studies of some existing facilities, but EPA does not argue that these impacts would be identical with (or should be used as the basis for estimating) what would occur at new facilities.

Also, as noted in response to comment 316bNFR.068.334, EPA did not estimate benefits for the new facilities rule precisely because these types of uncertainties are so large as to be insurmountable. For example, not only does the Agency not know where future facilities will be built, but EPA also lacks predictive knowledge of what their size, design, and performance parameters will be with or without the rule (likewise, EPA does not know in advance what types of waterbodies and aquatic ecosystems they will affect, or what species and lifestages will be impacted through impingement and entrainment).

As to the fifth assumption, the raw numbers EPA cites do not provide an accurate context for evaluating socially meaningful, population-level effects. Two examples from the ones EPA chose illustrate the importance of such contextual information. First, for the D.C. Cook Nuclear Generating Station on Lake Michigan, EPA cites losses of "1 million fish . . . during a 3-week study period" as a "documented case" of impacts associated with entrainment and impingement. 65 Fed. Reg. 49,073 n. 13. Those one million fish were almost all nonindigenous alewives, a fish species native to the Atlantic Ocean and introduced into the Great Lakes as a result of the opening of the St. Lawrence Seaway. See Gaulke 1998. <FN 55> Originally, alewives were an undesirable species in the Great Lakes. When this species entered the Great Lakes, there were no natural predators to control its numbers. The alewife population grew until there were too many for the Lake ecosystem to support. In the late 1960s and early 1970s, billions of alewives died each spring and washed up on the shores of Lake Michigan. The decaying fish caused a severe health problem, and some cities, such as Chicago and Milwaukee, spent hundreds of thousands of dollars to remove rotting alewives from city waterfronts.

In the early 1970s, states bordering Lake Michigan began stocking predatory fish species in the Lake to reduce the alewife population. When Cook Nuclear Plant impinged the one million alewives in three weeks, the alewife population had been reduced but was still the most abundant species in the Lake. One positive result of the reduced alewife population was the increase in yellow perch. Perch are a highly prized game fish. Alewives indirectly compete with yellow perch for food, and thus the large alewife population suppressed the yellow perch population. This was a case, then, in which cropping by the CWIS had a positive effect for purposes of achieving Great Lakes fishery management goals.

Additionally, the Michigan Water Resources Commission (MWRC) and the Michigan Department of Natural Resources, after reviewing portions of 59 University of Michigan reports on the ten-year study of the impacts of the Cook Nuclear Plant on Lake Michigan, concluded that the plant intakes were BTA. See MWRC 1987.

Our second confirmation of why raw entrainment/impingement numbers must be assessed at the socially meaningful population level is the Hudson River. EPA's Hudson River discussion is based on limited data collected more than 25 years ago and does not reflect the actual responses of Hudson River fish populations to entrainment and impingement. Boreman and Goodyear (1988), cited by EPA (65 Fed. Reg. 49,073 n. 14), developed estimates of conditional mortality rates for Hudson River fish species but drew no conclusions about the long-term effects of entrainment. In the years since these estimates were developed, monitoring and assessment studies performed by the Hudson River utilities, the New York State Department of Environmental Conservation, and the National Marine Fisheries Service have shown that all of the populations assessed by Boreman and Goodyear (1988) have remained stable or increased in abundance (CHG&E et al. 1999). The striped bass population of the Hudson, which was the primary target of this assessment, has dramatically increased over the past 20 years while the power plants have continued to operate with once-through cooling (NMFS 1998). The

abundance of Hudson River striped bass has become so robust in the presence of power plant impacts that in 1996 the New York State Department of Environmental Conservation, with the approval of the Atlantic States Marine Fisheries Commission, quadrupled the permissible commercial catch.

As to the sixth assumption, EPA ignores the fact that, in a number of the cases cited, the reported effects were reversed by technology identified during site-specific § 316(b) processes and subsequently installed. See, e.g., Thompson 1998 and Appendix I.

Footnotes

55 See Appendix K, which includes UWAG's letter dated December 16, 1998, to Sandy Farmer, U.S. EPA, and the Office of Information and Regulatory Affairs.

EPA Response

EPA discusses why if had not adopted a population endpoint for new facilities in the preamble to the final rule. Further, EPA believes that singling out one species for an assessment of impingement and entrainment impacts on aquatic resources in the Great Lakes, as the commenter has done, may be an overly narrow method for evaluating the affects from cooling water intake structures. As EPA has repeatedly stated in the Preamble and Response to Comments, aquatic communities are highly complex systems and predictions about how they will respond to specific stressors have frequently been incorrect.

Please see Response to Comments 316bNFR.056.005, 316bNFR.056.007, 316bNFR.061.006, 316bNFR.068.050, 316bNFR.068.090, and sections III and VI.B of the preamble for additional discussion of issues raised in this comment.

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Subject Matter Code 9.3

Documentation of I & E Impacts

Protection of Threatened and Endangered Species Already Is Occurring, and the Evidence Does Not Indicate that Entrainment and Impingement Are Significant Factors

EPA says that it is "concerned about the potential impacts of cooling water intake structures located in or near habitat areas that support threatened or endangered species. Although limited data document the extent to which threatened or endangered species are harmed or killed due to entrainment or impingement, such impacts do occur." 40 Fed. Reg. 49,072 col. 3. UWAG agrees that new facilities should be sited, designed and operated to avoid threatening listed species. But EPA ignores the fact that, if entrainment and impingement threatened the existence of any species or the recovery of a species listed as threatened or endangered under the Endangered Species Act (ESA) (16 U.S.C. § 1531 et. seq.), action would be required under the ESA. With broad regulatory authority for protection of threatened and endangered species already in place, any impacts occurring do not justify a separate rule, which would be subsumed by the overarching, highly protective standards of the ESA.

EPA points to three examples (Sacramento River winter run chinook salmon, delta smelt, and sea turtles) in which entrainment or impingement of threatened or endangered species has occurred. It provides little or no information, however, on levels of mortality, as distinguished from involvement with the intake structures. As the following discussion demonstrates, there is no evidence that entrainment or impingement is causing mortality at levels that would increase the risk of extinction or interfere in any way with a species' recovery.

On January 4, 1994, NMFS declared the Sacramento River winter run chinook salmon an endangered species. 59 Fed. Reg. 440. NMFS determined that the species' decline was related to a variety of factors, including the construction of two dams and the degradation of habitat by a variety of anthropogenic factors.<FN 56> Nowhere in the extensive analysis provided by NMFS is there any mention of entrainment by power plants as a factor causing the decline of the stock (although it does refer to the effects of large unscreened or poorly screened water diversion projects). Neither does the proposed recovery plan appear to suggest any required action by the power plants referred to by EPA.<FN 57>

As for delta smelt (Hypomesus transpacificus), the United States Fish and Wildlife Service (FWS) classified the species as threatened in 1993. 58 Fed. Reg. 12,854 (Mar. 5, 1993). This fish species occurs only in Suisun Bay and the Sacramento-San Joaquin estuary (known as the Delta) near San Francisco Bay, California. The FWS determined that the delta smelt is threatened primarily by large freshwater exports from the Sacramento River and San Joaquin River diversions for agriculture and urban use. Id. The prolonged drought, introduced nonindigenous aquatic species, reduction in abundance of key food organisms, and agricultural and industrial chemicals also threaten this species. Id. The FWS determination does not identify power plant entrainment or impingement as a cause of the decline, although entrainment by unscreened pumps for irrigation, which diverts water out of the Delta altogether, is cited as a major problem.

As for sea turtles, six species are found in United States waters. All are listed either as endangered or threatened under the ESA. They are threatened or endangered by a number of factors listed in the NMFS recovery plans for each species: fisheries bycatch, habitat loss, coastal development, dredging, and marine pollution and debris (NMFS, USF&WS 1991a; NMFS, USF&WS 1991b; NMFS, USF&WS 1992; USF&WS 1992). While power plant mortality is cited as a factor in these recovery plans, it is not considered important enough to be included as a task in the recovery programs for the turtles. As further evidence of the minor nature of this involvement, NMFS has issued numerous "no jeopardy" decisions and incidental take permits to power plants after case-by-case review as part of the ESA regulatory process.

Thus, protection of threatened and endangered species is already ensured through the ESA, and EPA has not shown that further entrainment/impingement controls, which would be superfluous and redundant of existing ESA programs, are needed to safeguard the viability and recovery of these species.

Footnotes

56 NMFS Proposed Recovery Plan for the Sacramento River Winter Run Chinook Salmon Chapter 3, Factors Affecting Winter Run Chinook. URL: http://swr.ucsd.edu/hcd/ch3.pdf.

57 NMFS Proposed Recovery Plan for the Sacramento River Winter Run Chinook Salmon Chapter 5, Needed Restoration Actions. URL: http://swr.ucsd.edu/hcd/ ch5.pdf.

EPA Response

EPA disagrees with the commenters position that cooling water intakes are not a risk factor for threatened or endangered species. Nevertheless, EPA is not basing this rule on its concern that it is necessary or essential to protect such species, although it will help to protect such species. See the preamble for the basis and purpose of today's rule final rule.

EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. It is reasonable to conclude that risks from cooling water intakes could include threatened or endangered species. The U.S. National Marine Fisheries Service and the U.S. Fish and Wildlife Service support this conclusion.

Stresses on populations and communities related to cooling water intakes may not manifest immediately. Impingement and entrainment of forage fish, other food sources, and/or diminishment of ecosystem health or complexity related to the impact of cooling water intakes could contribute to stress on an ecosystem. EPA believes that it is essential to take a precautionary approach toward protecting aquatic resources and especially so with threatened and endangered species. More importantly, the Endangered Species Act , section 2(c)(1) contemplates that other federal agencies will utilize their statutory authorities to protect threatened and endangered species. Also, EPA wishes to make clear that today's rule making in no way absolves or excuses facilities from meeting any obligations or requirements they may have under the Endangered Species Act.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.056

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Subject Matter Code 10.13

Request for Comment: Uniform Set of Standards Applicable to All Facilities

Estuary and Tidal River Definitions

EPA's proposed definitions for estuary/tidal river systems are not consistent with predominant scientific practice. Although EPA says its salinity values are based on the Venice System, it oversimplifies that system by ignoring the physiographic zones within an estuary that influence the distribution of populations of aquatic organisms. The Venice System separates brackish waters into five zones (mixohaline, oligohaline, mesohaline, polyhaline, and euhaline). Symposium on the Classification of Brackish Waters, 1958: The Venice System for the Classification of Marine Waters According to Salinity, Oikos, 9:311-312. Recognizing the entire five-zone Venice System would provide a more comprehensive ecosystem approach and make it easier to evaluate the complex functional interactions among the zones. The different zones allow more precise categorization of the habitat roles of the zones in the life cycles of anadromous species. Also, there are often substantial differences among the zones in hydrographic features, tidal flow, species composition, and biological productivity. While salinity in estuaries is dynamic in general, estuarine salinity zones are consistent enough over the year to be useful indicators of differences in aquatic habitat, and thus significant for the purpose of CWIS siting.

As an alternative, EPA should adopt the approach of its own Scientific Advisory Committee (SAC), which defines an estuary as the entire tidally influenced waterbody with unrestricted connection to an ocean or sea wherein there is substantial mixing of fresh water with saline marine water (EPA 1995). This approach delineates at least three zones based on general patterns of salinity, turbidity, and productivity (Pritchard 1967; Fairbridge 1980; and NYSDEC 1998). These three zones are a tidal freshwater zone; a tidal salinity transition zone, where mixing of fresh with marine salt water occurs and salinity varies annually, from less than 0.5 to 18 parts per thousand (by weight); and a tidal-influenced higher-salinity zone that extends to an unrestricted opening to an ocean or sea. The following table summarizes the characteristics of the estuary regions described by the SAC.

Table 1. SAC Estuary Characteristics

Region	Salinity	Turbidity/Productivity
Tidal River	<0.5 ppt (at low freshwater flow)	Moderate
Transition Zone	0.5 – 18 ppt	High turbidity/low production
Middle-Lower Reach	18 – 30 ppt	Low turbidity/high production

Equally important, in the preamble to the proposed rule EPA suggests that the estuaries and tidal rivers subcategory should include protected bays, sounds, and lagoons. 65 Fed. Reg. 49,084. But neither the four waterbody types nor their EPA-proposed definitions include or are appropriate for bays (e.g., Barnegat Bay, San Diego Bay), sounds (e.g., Long Island Sound, Puget Sound), lagoons (e.g., Aqua Hedionda, Point Mugu), or gulfs (e.g., Gulf of Maine, Gulf of Mexico, Gulf of Alaska), let alone other waters EPA has not identified, such as tidal straits. <FN 58>

The listed missing waterbody types, exemplified by the specific waters listed, have very different physiographic, biological, and trophic characteristics in comparison to estuaries/tidal rivers or the open ocean. Some estuaries do have a bay as a terminal component (e.g., the Delaware River Estuary), but there also are bays that are not components of estuaries (e.g., San Diego Bay and Barnegat Bay). Sounds and lagoons seldom, if ever, are components of estuaries or tidal rivers. Moreover, EPA's suggestion that all bays, sounds, and lagoons should be included within the estuary/tidal river subcategory will create confusion, because the salinity regime of some bays, sounds, and lagoons does not fit that prescribed for estuaries (greater than 0.5 ppt but less than 30 ppt) or tidal rivers (less than or equal to 5 ppt). Enclosed bays or sounds with very low freshwater input, like San Diego Bay, exceed 30 ppt in most places for most of the year. Thus, while EPA is on the right track by acknowledging the different characteristics of waterbodies, its proposed subcategories are in need of refinement.

Footnotes

58 A National Oceanic and Atmospheric Administration report distinguishes a tidal strait from a river. The authors suggest that "tidal strait" be defined as "a relatively narrow waterway connecting two larger bodies of water in which water movement is determined by the interconnected bodies." Swanson et al. 1982.

EPA Response

EPA has not substantially modified its definition of estuary/tidal river systems because the proposed definition is used by EPA in Agency programs and because the final rule de-emphasizes the waterbody categorization scheme proposed, in lieu of a two-track approach to the rule. EPA explains elsewhere why it is no longer using the waterbody categorization scheme as proposed. The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.010. Under the final rule, only the proportional intake flow requirements vary according to water body type. Thus, EPA believes its definitions of estuary and tidal river are reasonable as used in the final rule.

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Subject Matter Code 11.12

Littoral Zone in Lakes/Reservoirs

Rivers vs. Reservoirs

EPA proposes to define a freshwater stream or river as a "lotic (free-flowing) system that does not receive significant inflows of water from oceans or bays due to tidal action." Proposed § 125.83, 65 Fed. Reg. 49,116. It proposes to define a reservoir as "any natural or constructed basin where water is collected and stored." Id. EPA says further that "most of the large rivers in the United States have one or more dams that create artificial lakes or reservoirs." EEA, p. 11-8.

It is true that, in many cases, large free-flowing rivers in the United States have been dammed, creating "pools" (often managed by the United States Army Corps of Engineers) that might be deemed to meet EPA's definition of a reservoir. UWAG is unsure whether this is what EPA envisioned. But EPA's definition creates this ambiguity because it focuses on the creation of a "basin" rather than on how the waterbody functions biologically.

How a waterbody functions is largely a result of turnover rate. Thus, the pools along the Ohio River go up and down with river stage, but there is little or no lateral spread, and the turnover rate (i.e., the flow through the pool) is fairly rapid. As a result, the fish communities of the Ohio River are primarily riverine. Furthermore, zonation in the Ohio River is primarily longitudinal, not vertical. Thus, the Ohio River behaves and functions like a river, has the fish community of a river, and generally is considered by biologists to be a river.

At the other end of the spectrum are large water storage and cooling reservoirs. The turnover rate in these systems is slow. These systems function biologically like lakes, with extreme water level fluctuations and steep drop-offs.

Low-head dams present a particular definitional problem. These dams allow free flow of the river and medium-to-high river flows but impede river flow during periods of low flow, in order to ensure an adequate cooling water supply. The river flow is clearly impounded (as in a lake or reservoir), but river flow continues over or around the dams. The impoundments are too small to be "reservoirs" in the traditional sense and also too shallow. No thermocline develops, and the depth is typically eight to ten feet or less.

UWAG recommends that EPA clarify its definition of reservoir and consider linking it to biological function. The definition should cause rivers with low-head dams to be classified as rivers.

EPA Response

EPA has revised the definitions of freshwater rivers/streams and lakes/reservoirs to consider hydraulic retention time :

Freshwater river or stream means a lotic (free-flowing) system that does not receive significant inflows of water from oceans or bays due to tidal action. For the purposes of this rule, a flow-through reservoir with a retention time of 7 days or less will be considered a freshwater river or stream.

Lake or reservoir means any inland body of open water with some minimum surface area free of rooted vegetation and with an average hydraulic retention time of more than 7 days. Lakes or reservoirs might be natural water bodies or impounded streams, usually fresh, surrounded by land or by land and a man-made retainer (e.g. a dam). Lakes or reservoirs might be fed by rivers, streams, springs, and/or local precipitation. Flow-through reservoirs with an average hydraulic retention time of 7 days or less should be considered a freshwater river or stream.

Please also note that, after reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.068.058

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Using Waterbody Type and the "Littoral Zone" to Define "Sensitive Areas" Is an Oversimplification

EPA has proposed different requirements for different types of waterbodies (rivers, lakes, estuaries, and oceans), but the crux of the proposed rule is to protect the "littoral zone" of each type, plus the entire area of estuaries and tidal rivers. The littoral zone is defined as follows:

Littoral zone means any nearshore area in a freshwater river or stream, lake or reservoir, or estuary or tidal river extending from the level of highest seasonal water to the deepest point at which submerged aquatic vegetation can be sustained (i.e., the photic zone extending from shore to the substrate receiving one (1) percent of incident light); where there is a significant change in slope that results in changes to habitat and/or community structure; and where there is a significant change in the composition of the substrate (e.g., cobble to sand, sand to mud). In oceans, the littoral zone encompasses the photic zone of the neritic region. The photic zone is that part of the water that receives sufficient sunlight for plants to be able to photosynthesize. The neritic region is the shallow water or nearshore zone over the continental shelf.

Proposed § 125.83, 65 Fed. Reg. 49,116 col. 2-3. EPA discusses the importance of the location of the CWIS with respect to the littoral zone at 65 Fed. Reg. 49,083-85.

UWAG appreciates EPA's efforts to recognize that not all areas in a waterbody are sensitive to CWIS impacts and that location plays a key role in assessing and avoiding entrainment and impingement. However, we cannot agree with the approach EPA has chosen, which is neither clear nor biologically sound.

EPA appears to have chosen the littoral zone as a proxy for sensitive biological areas because it believes this choice makes the rule simple and relatively easy to apply. But the simplification does not adequately take account of the many biological, hydrological, and physical features of a site that should be taken into account when designing a CWIS. It is a simplification that restricts some areas where a CWIS could be placed and may even encourage CWISs in some places where they ought not to be. In addition, EPA's definition of the littoral zone is itself poorly drafted and oversimplified. We will start with the definition and then show why it does not work as a biologically sound concept for identifying sensitive waters.

EPA Response

See response to comment 316bNFR.068.004.

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

EPA's Definition of Littoral Zone is Confusing and Oversimplified

The term "littoral zone" generally refers to the section of a waterbody in which light penetrates to the bottom, allowing the growth of underwater vegetation where other factors support such vegetation. Thus, the littoral zone is defined in terms of the potential for rooted plant production, not fish production.

A littoral zone, for fresh water, is defined in The Oxford Dictionary of Natural History (1985) in terms of light penetration:

The zone in shallow fresh water and around lake shores where light penetration extends to the bottom sediments, giving a zone colonized by rooted plants.

This is a widely-accepted definition of a concept that can be defined only in general terms. <FN 59>

One way of reading EPA's proposed definition is that the littoral zone extends from the point of seasonal high water to the deepest area in which all three of the following conditions are met: (1) 1% incident light penetrates to the bottom (in which aquatic vegetation "can be" sustained), (2) there is a "significant" change in slope that results in changes in habitat or community structure, and (3) there is a "significant" change in substrate. An initial question raised by the definition is whether the second and third conditions specify conditions in the littoral zone or instead demarcate its waterside edge. An area of "change" typically marks the end of one area and the beginning of another. The structure of the definition and the word "where" suggest that EPA intends the first interpretation, but statements in the preamble suggest otherwise. For example, EPA says in the preamble that changes in the slope measurement indicate whether the "slope of the bottom changes dramatically enough to indicate an abrupt end to the littoral zone." 65 Fed. Reg. 49,097. It also says that "a change in substrate composition sometimes occurs as the littoral zone ends." Id. And EPA refers to light penetration as the "first, and most important, criterion," suggesting that the other two are subsidiary. 65 Fed. Reg. 49,097 col. 3. The preamble also talks about the change in substrate as something that "sometimes" occurs as the littoral zone ends (id.), suggesting it may not occur in some cases. Yet the definition seems to say it must occur for the zone to be considered "littoral." Appendix 1 of the preamble, which contains an extremely simplistic diagram, does not sort out the matter or resolve any of the ambiguities discussed below. See 65 Fed. Reg. 49,113.

Assuming that the proposed definition should be read literally and that EPA intends to capture areas of both incident light and continuing change, the definition is still unduly vague and will be extremely difficult to apply. For example, the definition refers to "significant" changes in slope and substrate but does not give any further information on what that term might mean. The definition also refers to areas where aquatic vegetation "can be sustained" due to the presence of sufficient incident light down to the substrate, but it does not appear to require that such vegetation actually be present or

specify what density or type of vegetation must be there.

Also, throughout the preamble and the EEA EPA refers to the littoral zone as a “nearshore” area. Yet EPA does not place any limitation on the distance to which the littoral zone may extend. In fact, it says that the littoral zone may encompass the whole waterbody<FN 60>. EEA, p. 11-8. If that is the case, it is difficult to see what features would make it especially unique or likely to concentrate organisms, since the organisms can choose the most favorable habitat presented by the waterbody as a whole.

Footnotes

59 For example, the source that apparently provided EPA a reference on the littoral zone in oceans (Sverdrup et al. 1942 (DCN:1-1042-TC)) noted that the treatise, which is regarded as the “bible” on this subject, clearly points out the problems with using the littoral zone as a boundary.

60 Similarly, in the EEA, p. 11-4, EPA discusses the littoral zone of the neritic region (i.e., the continental shelf). EPA says that the photic zone is narrow, yet it describes the continental shelf as big: 3 to 12 miles wide along the Pacific Coast and as much as 155 miles along the Atlantic. EPA gives no information on how far the “photic zone” may extend within the shelf.

EPA Response

See response to comment 316bNFR.068.004.

Comment ID 316bNFR.068.060

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Moreover, neither the definition nor any other aspect of the proposed rule or preamble gives any hint about the conditions under which the littoral zone must be assessed (except to suggest that the zone itself extends from the level of "seasonal high water") or whether the littoral zone may be considered fixed at the time of initial assessment. <FN 61> As discussed later in this section, conditions affecting incident light and other important factors for purposes of determining whether a given area in a waterbody meets EPA's proposed definition are likely to change over time. Turbidity, which affects light penetration, may be high in some seasons and not others. The inadvertent introduction of certain types of nuisance organisms, like zebra mussels, may increase clarity by removing biotic and non-biotic particles from the water column.

It is important to know when and how the littoral zone will be identified. Without additional details on this important issue now, UWAG cannot make meaningful comments. Equally important, unless EPA has thought through these issues before proposing the rule, it can have no realistic idea of how its proposal will affect CWIS locations or how much it will protect fish populations. As discussed below, UWAG believes the concept of the littoral zone is too broad to be useful. While we applaud EPA's intention – to differentiate between sensitive areas and less sensitive ones – we do not believe the littoral zone approach is the answer.

Footnotes

61 Post-operative monitoring of the littoral zone is not required by EPA's proposal. Rather, the littoral zone is to be identified as part of the source water physical data. See proposed § 125.86(b)(1)(iii), 65 Fed. Reg. 49,120. It is not completely clear, however, that the source water physical data (and other studies identified in this section) do not need to be collected again upon permit renewal. UWAG believes strongly that any such requirement would be wholly unjustified and urges EPA to clarify that repeat studies are not required.

EPA Response

See response to comment 316bNFR.068.004.

In any case, the literature EPA included in the record does not support the proposed definition of "littoral zone," because the definition differs from how the term is commonly (and quite generally) understood by aquatic biologists. For example, Cody and Diamond 1975 (DCN:1-1013-TC) state that macroscopic algae and other plants are eaten by many stream organisms but do not mention littoral zones. Odum 1971 (DCN:1-1022-TC) pp. 318-21, states that the prominent zonation for streams is longitudinal, generally consisting of two major habitats (rapids and pools), with current velocity being the dominant controlling influence on habitat diversity. Odum also describes longitudinal zonation of aquatic plants and animals. Littoral zones are not recognized in stream/river systems.

Additionally, because of the combination of current velocity and seasonal and annual variation in water level, growth of rooted aquatic vegetation is typically absent or scarce in shallow water along the shores of streams and rivers. Hynes 1970 (pp. 383-97) also describes the longitudinal zonation of stream/river system habitats. Most algae and macrophyte growth and associated animal life in streams/river systems are forms specially adapted to flowing water and occur attached to rocks and other firm substrates distributed across the stream bed. Most species of rooted aquatic plants are not adapted to living in assemblages of species typical of plant communities in freshwater stream/river systems. Few species occur except in very sheltered areas (id. pp. 82-83). Organic material from the watershed; phytoplankton; and algae and macrophytes attached to rocks in rapids, gravel beds, and other firm substrates are typically the predominant sources of food in streams. Pools behind dams on streams develop characteristics somewhat like lakes, including more littoral areas, especially in back waters, due to reduced flow velocity and more stable water level.

Littoral zones are included in the zonation of lakes and are particularly prominent features of ponds and small lakes (Odum 1971 (DCN:1-1022-TC); Wetzel 1975 (DCN:1-1072-TC); Cole 1975 (DCN:1-1014-TC); Resh and Rosenburg 1984 (DCN:1-1028-TC)). Littoral zones are less prominent in large lakes and reservoirs and may be absent from long segments of inshore shallow waters of those waterbodies (Phillips et al. 1995, Fig. 1 (DCN:1-1024-TC)) due to hard bottom types, light limitation, scour impact of high energy waves, and frequent water level fluctuations.

Littoral areas also are identified as a zonation feature of estuaries. Areas exposed to strong currents and/or tides where the bottom consists of coarse sediment such as sand (absent rooted aquatic plants and associated animal species) are called high physical energy areas (Day et al. 1989, Table 1.1 (DCN:1-4021-BE)).

The record does not support the need for special protection of littoral areas in freshwater tidal rivers. However, the habitat areas designated by Day et al. 1989, could legitimately be applied to tidal rivers. Day and others include bordering wetlands as a separate habitat category, not a littoral area.

Support for the delineation of littoral zone in oceans (Sverdrup et al. 1942 (DCN:1-1042-TC)) is highly problematic, as Sverdrup et al. note. These include:

* The dividing line between littoral and deep-sea systems has been set at a depth of about 200m on the arbitrary supposition that this represents the approximate depth of water at the outer edge of the continental shelf, and, roughly, also the depth separating the lighted from the dark portion of the sea.
* Some have proposed defining the littoral zone for oceans as the intertidal zone between high and low tide, regardless of whether or not this area is occupied by the complex of rooted aquatic plants, associated algae, and animal life. The intertidal zone along much of the open coast consists of shifting sand substrate, a harsh habitat that precludes development of such a littoral community.
* Attempts to define the littoral zone based on the depths below the intertidal zone at which macrophytes, such as Fucus, Laminaria, etc., are characteristically attached has the disadvantage that the plants are frequently absent along vast stretches of the coast, owing to unfavorable substratum or other ecological factors.
* EPA's proposal to extend the definition of littoral zone to the edge of the continental shelf is not supportable, because it is not at all certain that light is sufficient for plant growth at that depth or that littoral communities exist out to that depth (Sverdrup et al. 1942).

The phrase in EPA's proposed definition "extending from the level of highest seasonal water to the deepest point at which submerged aquatic vegetation can be sustained" is not included in the definition of "littoral zone" contained in any reference listed by EPA, and for good reason. Including the language "from the level of highest seasonal water" would result, for streams and rivers, in the inclusion of all land area beyond the banks inundated by floods and, for estuaries and oceans, inclusion of all lands flooded by the mounding of water caused by hurricanes. Accepted scientific practice, including references cited by EPA (Odum 1971 (DCN:1-1022-TC); Wetzel 1975 (DCN:1-1072-TC); Cole 1975 (DCN:1-1014-TC); Resh and Rosenberg 1984 (DCN:1-1028-TC)), support defining the upper level of the littoral zone for ponds and lakes as the shoreline plus the area wetted by spray and waves occupied by rooted aquatic plants and associated attached algae, and for estuaries and oceans as the level of mean high tide occupied by rooted aquatic plants and associated attached algae. Moreover, the language "level of highest seasonal water" is contradictory of the language in EPA's following parenthetical phrase, "extending from the shore."

Also, the language in EPA's proposed definition "to the deepest point at which submerged aquatic vegetation can be sustained" is not synonymous with its following parenthetical language "from the shore to the substrate receiving one percent of incident light." The reason is that there are other factors besides light penetration that determine whether rooted aquatic plants can grow at all in shallow areas and to what depth they can grow. These factors include strong currents and/or waves (Day et al. 1989 (DCN:1-4021-BE), Table 1.1) and major seasonal, annual, and longer-term water level fluctuations.

EPA's proposal to define the littoral zone as the area where, among other things, "there is a significant change in slope that results in changes to habitat and/or community structure; and where there is a significant change in the composition of the substrate (e.g., cobble to sand, sand to mud)" is not supported by the documents included in EPA's docket. The reason is that neither of those two features is an inherent characteristic of littoral zones.

EPA Response

See response to comment 316bNFR.068.004.

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

The Littoral Zone Is a Poor Surrogate for Areas Vulnerable to Intake Effects

EPA says it is proposing "to require expansive BTA requirements in tidal rivers, estuaries, and the 'littoral zone' of freshwater rivers, lakes, and reservoirs." 65 Fed. Reg. 49,083 col. 3. But it gives no scientific basis or record evidence for its belief that all areas within all littoral zones everywhere must be protected from the effects of CWISs. Although the definition of "littoral zone" is somewhat imprecise, EPA apparently has assumed that (1) the definition of the littoral zone will be relatively straightforward and promote regulatory consistency, (2) all areas within the littoral zone are very productive and thus deserve the highest degree of protection, (3) all organisms within the littoral zone are particularly vulnerable to CWIS effects, (4) the vulnerability contributes to adverse effects on population, and (5) areas outside the "littoral zone" will be less sensitive. None of these assumptions is necessarily correct.

a. The Littoral Zone is Dynamic and Subject to Change

As noted above, one factor that leads to ambiguity and uncertainty is the fact that the littoral zone may change over time. For example, the location or depth of a littoral zone is often dynamic and influenced by many natural and anthropogenic factors, including the following:

* water level fluctuation (extended periods of drought, or of excessive rainfall);
* water quality (turbidity, nutrients),
* water temperature (ambient, heat load),
* water movement (wave action, velocity),
* flora and fauna (native or exotic, natural or stocked, species diversity),
* temporal influences,
* waterbody latitude (solar exposure),
* waterbody bottom topography and/or bathymetry,
* waterbody uses,
* source water,
* substrate, and
* surrounding land type and use.

Many of these factors can be related, or even highly interdependent, but a change in any one factor can change the location or depth of the littoral zone. For example, the littoral zone can become larger if more light reaches the bottom, and this can happen if the clarity of the water improves. Zebra mussels, for example, can improve water clarity by filtering out both abiotic and biotic suspended particles.

One researcher measured changes in water transparency and planktonic diatom concentrations after the establishment of zebra mussels in western Lake Erie in 1990-92. Water transparency data from

1990-92 were compared to data from 1984-86. Diatom data from 1990-92 were compared to data collected in eight pre-zebra mussel years. Comparisons between mean transparency values from pre- and post-invasion years showed a 100% increase in light penetration after arrival of the zebra mussel. Differences were statistically significant at the 0.01 level. Declines in abundance of planktonic diatoms from the 1960s to the 1980s were likely attributable to reductions in phosphorus loadings to Lake Erie in the 1970s and early 1980s. Abundance of diatoms in post-zebra mussel invasion years were significantly lower than in any pre-invasion year at a significance level of 0.01 (Holland 1993). Zebra mussel infestation in Lake Ontario, too, has resulted in an offshore shift of the littoral zone, and Lake Michigan has been affected as well. In Lake St. Claire, too, it is reported that zebra mussels increased the photic zone.

The following examples, focusing on reservoirs in the Southwest, illustrate the difficulties that can occur in using the littoral zone as a surrogate for ecosystem productivity or sensitivity.

Beginning in the late 1980s, the 5,020-acre Martin Creek reservoir developed an extensive infestation of the nuisance aquatic plant Hydrilla verticillata, affecting over 2,000 acres (more than 40%). Before the infestation, the reservoir had a water clarity of 2-3 feet, typical of similar reservoirs in that region of Texas. The Hydrilla had a dramatic effect on the water clarity by helping to "drop out" the suspended solids. During the infestation, the water clarity (i.e., the littoral zone) expanded to a range of >=7 feet. More recently, due to several factors (e.g., drought, seasonal warm temperatures, biological controls, etc.), the infestation has abated and the pre-infestation water clarity restored.

As a second example, consider the 3,228-acre Squaw Creek reservoir that was constructed and inundated in the late 1970s. The power plant for which it was constructed did not begin operating until 1990. During the first decade, because of the water source, location, and depth, the water clarity was unusually high (>20 feet). The introduction of a heat load, in the form of once-through cooling, resulted in a much more productive waterbody. Due to the increased energy input, planktonic growth expanded tremendously, and water clarity decreased to only 2-3 feet. Another effect was that the overall fishery improved. With respect to a reservoir like this, EPA's definition of "littoral zone" raises puzzling questions. How would the littoral zone of a new reservoir like this one be determined? Would its purpose or eventual use be considered? Would the increased productivity and diversity be considered?

Drought conditions create another concern. At present, many areas of Texas are in a five-year drought. During this time, many reservoirs have had extended periods of below-normal pool level elevations. At the same time, littoral zones have become established at locations and depths that will not survive when normal pool levels return. One reservoir endured a seven-year drought and, over that time period, declined to 17 feet below normal pool level. One localized, extremely heavy rain event this spring raised the reservoir 15 feet. As a result of the sudden rise in level, the water clarity decreased, so that the previous littoral zone is no longer functional.

Additionally, land use and development in both urbanized and rural areas often make dramatic changes to a littoral zone. Changes in land use can alter water quality (e.g., by sediment loading, changes in nutrient values, etc.). Such changes also can alter the solar loading, wind/wave effects, and species diversity. Upstream or source water diversions can change the littoral zone by changing the in-source flows, flow regimen, or entry points. As for all of the natural environment, the only consistent theme is

change.

EPA Response

See response to comment 316bNFR.068.004.

Comment ID 316bNFR.068.063

Author Name Terry M. Hogan & David E. Bailey

Organization Utility Water Act Group c/o Hunton & Williams

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Not All Areas Within the Littoral Zone are Highly Productive, Much Less Sensitive

Not all areas of the littoral zone have the same level of productivity. This is because whether or not a given area supports aquatic vegetation depends on factors beyond the amount of incident light. The type of substrate (not necessarily its change), flow considerations, dissolved oxygen levels, annual variation in water level, sedimentation, and a host of other factors influence whether rooted vegetation can exist, what type it is, and how dense it will be. Also, how attractive aquatic vegetation is to species that are likely to be vulnerable to entrainment and impingement is very much a site- and species-specific matter. Factors like substrate type, structural habitat features for cover and refuge, and shoreline cover (e.g., trees) for shading may have a critical influence on whether an area is or is not attractive to a given species.

Consider the following example, which illustrates this fact. One of the objectives of an intensive ichthyoplankton investigation of a 45-mile portion of the Upper Illinois Waterway was to determine when and where fish spawning was occurring (EA 1995). Sampling was conducted in the following habitats, all of which (except for the main channel, a dredged barge channel), would be considered to be in the littoral zone: the main channel, main channel border, backwater, riffle/run/tailwater, and tributaries. Investigators collected at least 48 species and possibly as many as 62 species. (Some larvae can be identified only to genus or family). The most productive areas in terms of species richness were backwater (~30 species) and tailwater (~24 species) areas. Although the study was not designed to yield quantitative data, it indicated that the tributaries were highly productive (59.4% of larvae collected), while backwater and tailwater locations were less so (9.7% and 8.3% respectively).

UWAG does not dispute the notion that some areas within a littoral zone may be productive, but this productivity is at the primary producer level (i.e., phytoplankton, periphyton, and macrophytes). See, e.g., Goldman and Horne 1983 (DCN:1-3024-BE). The fact that an area supports a high biomass of phytoplankton or periphyton does not necessarily mean the area will be productive in terms of fish biomass. In many rivers (e.g., Wabash, Muskingum, Susquehanna), practically the entire river is within the "littoral zone" as EPA proposes to define it. In lakes, the littoral zone covers a huge area. For example, in western Lake Erie the littoral zone could easily extend a mile offshore (Cole 1978 (DCN:1-3010-BE)). Where such a large portion of a given waterbody falls within the "littoral zone," the littoral features no longer mark unique or special habitat. <FN 62>

Footnotes

62 EPA's proposed regulatory plan appears to be based on the supposition that littoral zones or areas extend in a concentric band along the entire shorelines of all waterbody types. See, e.g., 65 Fed. Reg. 49,084. This is demonstrably not true, and EPA's referenced documents do not support it (Day et al. 1989; Sverdrup et al. 1942; Phillips et al. 1995). The supposition may be true of many ponds and small lakes; it is not true for many large lakes and reservoirs, most streams and rivers, or many of the tidally influenced coastal waterbody types. Therefore, even if EPA's assumption about productivity and sensitivity were true, there are many waterbodies or segments where shoreline CWISs could be located and operated without harm to littoral zones. The horizontal extent of littoral plant growth with increased depth is subject to substantial

change on annual and longer time scales due to factors such as changes in turbidity, erosion (Buzzelli 1998 (DCN: 1-1009-TC)), changes in water elevation, and other internal and external factors.

EPA Response

See response to comment 316bNFR.068.004.

Comment ID 316bNFR.068.064

Author Name Terry M. Hogan & David E. Bailey

Organization Utility Water Act Group c/o Hunton & Williams

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Not all Organisms are Equally Vulnerable to CWIS Effects, And Vulnerability May Occur Inside or Outside the Littoral Zone

Equally important is the fact that whether or not an area is or is not productive (regardless of how "productivity" is measured) does not make it "sensitive." The vulnerability of organisms – their likelihood of being entrained or impinged – is the issue, not productivity, water depth, or some other surrogate measure. As EPA itself says of species within the littoral zone of rivers, streams, lakes, and reservoirs:

The fish of this zone typically follow a spawning strategy whereas eggs are deposited in prepared nests, on the bottom, where they incubate and hatch. As the larvae mature into fry and early juveniles, some species disperse to open water, while most others complete their life cycle in the littoral zone. Because these species do not employ a reproductive strategy, the eggs and larvae are not readily integrated into the drift component of the water column; this reduces the potential for entrainment.

65 Fed. Reg. 49,084 col. 1.

In short, what makes the difference as an initial matter is whether the aquatic organism is likely to come into contact with the intake structure. From there, the potential for "adverse" impact will depend on whether that contact results in mortality; how many organisms out of a given population are entrained or impinged; and whether that population has compensatory mechanisms that accommodate the level of entrainment or impingement. While species that spawn in open or "pelagic" waters tend to experience correspondingly greater levels of entrainment, many of those species also have substantial compensatory mechanisms. See Part VII.F.3 below. Thus, the effects at the population level are not "adverse." See also Part VIII.

The following examples illustrate this point. The upper Illinois Waterway, although improving, has been impaired (due to low dissolved oxygen, toxic sediments, and its use as a shipping channel) since the early 1900s. The most commonly collected species or taxa there – Lepomis spp., gizzard shad, common carp, bluntnose minnow, Pimephales spp., and emerald shiner – have early life stage characteristics that allow them to be successful in this environment. They have adhesive or buoyant eggs, are spawning generalists, and prefer to spawn in slack water or protected areas. Their larvae tend to remain in these areas. Some larvae are pelagic, while others have cement glands to attach to vegetation and local structures. They have well-developed respiratory structures, or adults fan the eggs and early larvae. Some species, such as emerald shiner, are also highly prolific (EA 1996). Several of these characteristics, while improving survival success in an impaired environment, also reduce susceptibility of entrainment impact. These organisms are being collected in various locations (e.g., backwaters, tailwaters, main channel border) in the EPA-defined littoral zone, but the potential of impact attributable to the CWIS varies significantly.

This same point is well illustrated by analysis of the desirability of extending the CWIS offshore at the Moss Landing Power Station. There biologists from the Department of Ecology and Evolutionary Biology at the University of California (Santa Cruz) concluded that significant entrainment by the existing shoreline CWIS occurred, but that the entrainment did not compromise the source waterbody (a slough) as a whole. See Raimondi and Cailliet 2000. They also concluded that an offshore CWIS likely would have effects on different species and those effects likely would be more biologically and socially significant than the effects of the existing CWIS. Id. Notably, they make the point that research suggests that impingement increases as the length of an intake pipe increases, because "fish become increasingly unable to navigate back up the tunnel as it becomes longer." Id., p. 2.

In short, whether organisms are vulnerable to CWIS effects and how many are vulnerable is a site-specific matter. See, e.g., EEA, p. 11-5. Encouraging facilities to put their CWISs outside a "littoral zone" may do more harm than good, if the location is not selected based on biological reality rather than grand theory.

EPA Response

See response to comment 316bNFR.068.004.

Comment ID 316bNFR.068.065

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Subject Matter Code 12.0

Best Technology Available-Flow and Volume

EPA's Limits on Intake Volume Are Irrational, Because Many Other Factors Determine Entrainment Mortality

Attempting, apparently, to avoid the problem of biological complexity, EPA assumes in the proposed rule that minimizing flow (volume) also minimizes entrainment,<FN 63> which it equates with adverse environmental impact. EPA therefore proposes to restrict design intake flow rate by (1) setting a maximum flow rate relative to the flow of the source waterbody and (2) for some waterbody type/proximity to the littoral zone combinations, requiring a flow level commensurate with that which could be achieved by closed-cycle cooling.

EPA discusses this at 65 Fed. Reg. 49,085-87, where it says "the magnitude of entrainment impacts is directly related to the capacity or intake flow (or volume) of cooling water intake structures." 65 Fed. Reg. 49,085 col. 1. This statement, one of the bedrock assumptions on which the rule rests, is unsubstantiated. It is based on the idea that, if organisms are distributed evenly throughout the water column <FN 64>, a greater volume of water will (of course) contain a greater number of organisms and therefore cause a greater amount of harm, assuming all organisms suffer equal harm when entrained. But nowhere does EPA assess the expected flows into new facilities or try to show empirically that large flows necessarily cause large environmental impact.

Moreover, the assumption that water volume is directly related to harm is not only highly overprotective, it is wrong, and wrong in at least four ways:

1. Some organisms are not entrained because of life history strategies.
2. Some organisms are not entrained because of their distribution in the water column over time and space.
3. Not all organisms that are entrained are killed.
4. Sacrificing some organisms does not necessarily harm the population or amount to adverse environmental impact.

Footnotes

63 In its discussion of the two types of proposed flow limits, EPA appears to focus mostly on entrainment, not impingement. UWAG argues that impingement is not significantly correlated with flow. See E. P. Taft, Thresholds: Can the Potential for Environmental Impacts Be Determined on the Basis of Plant Design or Operational Variables?, in Proceedings: 1998 EPRI Clean Water Act Section 316(b) Technical Workshop at 16-1 (April 1999).

64 EPA says that this is a conservative but handy assumption. EEA, p. 11-3. UWAG agrees, and we note that, because it is conservative, actual differences in distribution (such as the phenomenon of organisms rising or falling in the water column according to diel cycles) are likely to make organisms less vulnerable to entrainment.

EPA Response

On the basis of the supporting data presented in the proposed rule and the NODA, Track I and Track

II of today's final rule maintain the proposed flow limitations with some changes. EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See ,# 2-029, 2-013L-R15 and 2-013J). EPA also has determined that a capacity- and location-based limit on withdrawals in certain waterbody types is an achievable requirement that will have little or no impact on the location of cooling water intake structures projected to be built over the next 20 years.

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. EPA disagrees with commenters that other factors influential to impingement and entrainment have been ignored. Both Track I and Track II of the final rule allow for site-specific evaluations in determining the appropriate technologies to be implemented. For example, the Design and Construction Technology Proposal Plan required in Track I and the Evaluation of Potential Cooling Water Intake Structure Effects in Track II allow for site specific consideration of factors other than flow to minimize impacts from impingement and entrainment. Cumulative impacts are addressed on a case-by-case basis by each permitting authority.

Life History Strategies Keep Some Organisms Away from the Intake

As noted above, many factors besides placement in a littoral zone affect entrainment and impingement. See generally Appendix C. Many fishes (white perch, sturgeons, and many minnows) produce adhesive eggs that attach to substrate until they hatch (Auer 1982). Some fish (salmon and trout) build redds in which the eggs are buried under sediments or gravel. Others (sunfish and catfish) build nests that are protected by adults during the egg and early larval stages. Even in the littoral zone, some species spawn in protected areas, like shallows and weed beds, and the newly hatched larvae remain there until they are actively feeding and swimming. Larvae of benthic species like sturgeon and catfish seek out and hide under cover along the bottom.

Littoral species like minnows, sunfish, mullets, and killifishes move toward shallow waters along the shoreline, where they may find protection. Structure-oriented species, like reef and kelp inhabitants, move toward these protective areas. In most cases, movement toward such preferred nursery habitats reduces the exposure of the fish to currents and lowers densities in the water column. Many species whose spawning takes place in far offshore waters of large waterbodies like the Great Lakes or ocean (for example, cods and grouper) may have relatively low susceptibility to entrainment at intakes situated at the shore. See Appendix C. During their later larval and early juvenile stages, many macroinvertebrates and some finish settle out of the water column and stay on the bottom, where they are no longer as susceptible to entrainment.

Equally important, species that are at greater risk (e.g., pelagic spawners with buoyant eggs or those with drifting larvae) employ a survival strategy that naturally mitigates entrainment losses (Coutant 1999). These species (e.g., freshwater drum, gizzard shad, bay anchovy) typically produce huge numbers of eggs and make no investment in nest building or parental care. Their approach to survival is quite literally to put all their eggs in one basket. Their survival strategy is built on the premise that mortality to their eggs and larvae will be exceedingly high, for which they compensate by producing huge numbers of eggs. Thus, the numbers of eggs or larvae of these species entrained may seem large, but the losses are probably small compared to the total loss expected (Coutant 1999).

The other major factor determining the likelihood of entrainment is habitat. Except for pelagic spawners, fishes are very particular about where they spawn. In fact, Balon (1975) developed an entire classification system – so-called “spawning guilds” – for fish based on where and how they spawn. Thus, fish are characterized as phytophils (obligatory plant spawners such as common carp), lithophils (rock and gravel nesters, e.g., most sunfish species), and psammophils (sand spawners, e.g., the sand shiner), among others. Knowledge about the spawning guild to which a species belongs and which species are likely to be present near a proposed CWIS allows an accurate, site-specific assessment of the likelihood of entrainment, rather than the generic approach proposed by EPA.

Other factors like ambient temperature and salinity also affect organisms’ susceptibility to entrainment

and impingement. See Appendix C.

EPA Response

EPA agrees that there are many other factors besides placement in a littoral zone that affect entrainment and impingement. That said, EPA is no longer implementing the proposed "generic approach." The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit applicant to select and implement design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish. These design and construction technologies may be modified by the permit director in subsequent permits if the original design and construction technologies do not meet the applicable requirements in § 125.84 of today's rule, or if such modifications are necessary because of the effects of multiple intakes on the same water body, seasonal variations in the aquatic environment, or the presence of regional important, threatened, or endangered species. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I. Track II also requires the applicant to meet the same proportional flow requirements that apply in Track I.

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Organization Utility Water Act Group c/o Hunton & Williams

Subject Matter Code 12.0

Best Technology Available-Flow and Volume

Distribution in the Water Column Affects Susceptibility to Entrainment

While it is conservative to assume random distribution of organisms in the water column, as EPA acknowledges (EEA, p. 11-8), many of the aquatic organisms most susceptible to entrainment are not randomly distributed. See Appendix C. Nonrandom distribution occurs because of a variety of factors, including water density differences, habitat preferences, and active vertical migrations. Most aquatic organisms have a slightly higher density than the water, causing them to have a natural tendency to sink. Because of their limited swimming ability, the earliest life stages in many species depend on water currents to keep them up in the water column and off the bottom. As a result, they tend to be found at greatest densities near the bottom, unless currents keep them suspended. Other species use physiological mechanisms, such as oil droplets, that make the early life stages less dense and consequently cause them to float.

As organisms get older, their greater size and swimming ability allow them to move up and down in the water column toward the depths they prefer. See Appendix C. The reasons for moving up and down in the water column include dispersion, predator avoidance, and increased food availability. Id. For some species, this migratory behavior results in vertical distributions that remain constant for a life stage. For example, drums, croakers, and blue crabs selectively use depth-varying tidal currents to move quickly from spawning areas toward larval nursery areas. Other species, such as herrings, striped bass, copepods, and opossum shrimp, move up and down in the water column regularly. Other individuals of these species move into deeper waters near the bottom during daytime to avoid predators and disperse up into the water column to feed at night. See Appendix C. Such diel vertical migrations are common among many pelagic species of fish and macroinvertebrates.

These nonrandom distributions can have enormous implications for potential entrainment/impingement and thus for strategies of intake design that consider such movements. For example, certain intake designs (offshore velocity caps, skimmer walls on shoreline intakes) withdraw from a selected depth in the water column, and thus may significantly reduce potential impacts. EPA does not recognize, and certainly does not analyze, whether such design considerations may, at least at some locations, minimize AEI.

EPA Response

Under Today's rule, stakeholders are given 2 options, or tracks, to choose from when building new facilities. This two-track approach addresses commenter's concerns. Track I establishes specific capacity, velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment of fish, shellfish, eggs, and larvae and requires the applicant to select and implement the best technology available to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish and shellfish. Track II allows the facility to

conduct a comprehensive demonstration study to show that alternative controls will meet the same impingement and entrainment reduction levels that would be achieved by a shoreline intake meeting the Track I requirements at the same site. If there are far fewer organisms impinged or entrained by moving the location of the intake, that will factor into whether the permittee satisfies Track II. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures. Therefore, it is up to the stakeholders to prove whether certain intake designs (offshore velocity caps, skimmer walls on shoreline intakes), may significantly reduce potential impacts, if they choose to implement them under the Track II approach.

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Best Technology Available-Flow and Volume

Many Organisms Survive Entrainment

The amount of entrainment survival at a CWIS has been recognized to have a major influence in reducing the potential for AEI (Englert and Boreman 1988). It is important, therefore, to examine to what extent organisms survive entrainment.

In support of its requirement for flow minimization, EPA asserts that "[t]he mortality rate of entrained organisms is high." 65 Fed. Reg. 49,072 col. 2. However, many in situ studies at operating power plants and laboratory simulations of CWIS entrainment exposure show that the mortality rate of entrained organisms is not necessarily high. To the contrary, these studies show that entrainment mortality in open-cycle cooling water systems is often minimal (Lauer et al. 1974; Cannon et al. 1978; EAI 1978a; EA 1986; Jinks et al. 1981; Muessig et al. 1988; Boreman and Goodyear 1988). Depending on the species entrained at a particular site and the CWIS operating conditions during entrainment, survival of entrained organisms and may, in some cases, approach 100 percent.

As described below, the mortality rate of entrained organisms is influenced by the design and operation of the facility's CWIS, by the tolerance of the specific taxa susceptible to entrainment at the facility, by the size of organisms entrained, and by the seasonal and diel timing of entrainment relative to ambient temperatures and plant operating conditions. Because entrainment mortality varies widely based on site-specific and species-specific factors, whether a particular CWIS is causing or is likely to cause AEI cannot be determined categorically by using a single flow criterion.

The entrainment survival realized by each species and life stage may be influenced by cooling water system design and operating conditions that affect the physical, thermal, and chemical stresses present during entrainment. See Appendix C. The most important design consideration is whether the cooling water system uses cooling towers or is open-cycle. Cooling towers cause essentially 100 percent mortality of entrained organisms, due to the magnitude of system stresses and the fact that cooling water recirculates in these systems. Because many species and life stages survive entrainment in open-cycle CWISs, this high cooling tower mortality may substantially offset the benefits of reduced flow.

Experiments using pressure chambers and simulated condenser systems have shown that a wide variety of species can tolerate the large pressure changes and shear forces that are found during normal open-cycle cooling water system operation. These studies indicate that pressure increases probably do not damage most entrained organisms and that substantial mortality from pressure decreases (>25 percent) is due mostly to subatmospheric pressures, which are not characteristic of most open-cycle designs (NYU 1975, Coutant and Kedl 1975, NYU 1979, Cada et al. 1981). The range of variation in pressure is constrained by the need for efficient hydraulic performance, which probably explains why entrainment survival estimates are similar for the same taxonomic groups at different power plants.

EPA Response

EPA believes that closed-cycle cooling is more effective at minimizing impingement and entrainment then to open-cycle cooling. For example, the potential benefits of lowering intake flows to a level commensurate with those of a closed-cycle recirculating cooling water system (for the projected facilities not already planning to use such systems) is illustrated by comparisons of once-through and closed-cycle cooling systems (e.g., the Brayton Point and Hudson River facilities). The potential benefits of minimizing intake flow and associated impingement and entrainment is illustrated by data for the Brayton Point facility, located on Mt. Hope Bay in Massachusetts. In July 1984, the operation of Unit 4 was changed from closed-cycle cooling and piggyback operation to once-through cooling. Although conversion to once-through cooling increased intake flow by about 41 percent, the facility requested the change because of electrical problems associated with salt contamination from Unit 4's closed-cycle cooling canal equipped with spray modules. The lower losses expected under closed-cycle operation can be estimated by comparing losses before and after this modification. Based on reports providing predicted or actual losses after the Unit 4 modification, EPA estimates that the average annual reduction in entrainment losses of adult equivalents of catchable fish resulting from closed-cycle operation of a single unit at Brayton Point (reducing the flow of that unit from 1,045 MGD to 703 MGD) would range from 207,254 Atlantic menhaden (Brevoortia tyrannus)1 and 155,139 winter flounder (Pleuronectes americanus)2 to 20,198 tautog (Tautoga onitis)2 and 7,250 weakfish (Cynoscion regalis)2 per year. Assuming a proportional change in harvest, the lower losses associated with a closed-cycle system would be expected to result in an increase of 330,000 to 2 million pounds per year in commercial landings and 42,000 to 128,000 pounds per year in recreational landings.

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Subject Matter Code 12.0

Best Technology Available-Flow and Volume

Entrainment Mortality Depends on What Taxa Are Present

Studies of open-cycle cooling systems indicate that a high percentage of many species survive entrainment when discharge temperatures are below upper lethal thresholds, although the percentage varies among taxonomic groups and species. For example, a review of ichthyoplankton entrainment survival estimates from 12 power plants sited on freshwater, estuarine, and marine systems indicates up to about a fourfold difference in survival rate among species entrained at each CWIS, and about an eightfold difference among 21 taxa collected across all 12 sites (Jinks et al. 1981).

Of the 13 families of fish represented in these studies, herrings, anchovies, silversides, and sand lances were relatively sensitive to the physical effects of entrainment (survival of 23-48 percent), while the sensitivity of cods, gobies, and suckers were moderate (survival of 52-60 percent). Eels, carps and minnows, temperate basses, perch, drums, and flounders were highly tolerant of entrainment, with survival of 75-100 percent. Overall, more than half the reported estimates were greater than 75 percent survival, and more than three quarters were greater than 50 percent. Entrainment survival of macroinvertebrates also has been shown to be very high, approaching 100 percent so long as discharge temperatures are below upper tolerance limits of the organisms (Cannon et al. 1978).

Thus, it is a mistake to assume, without evidence, that all larvae entrained by a power plant are killed. This was the prevailing opinion in the late 1960s and early 1970s, but due to extensive research at Hudson River power stations, the preconceived ideas about 100% mortality began to give way. UWAG understands that EPRI will be issuing a report that is likely to support this conclusion.

EPRI has reviewed 35 entrainment survival studies conducted at 20 power stations. These studies represent most, and perhaps all, available studies of entrainment survival of fish eggs or larvae and macroinvertebrates. Most of the studies were done from 1975 to 1980, mostly in the Northeastern United States, primarily on the Hudson River. Smaller clusters of studies were done in large midwestern rivers and the San Francisco Bay/Delta area.

The EPRI study includes data from 35 reports for 20 power stations, covering approximately 50 species and taxa groups. Over half the study reports are for Hudson River power stations; consequently striped bass, white perch, clupeids (herring), and estuarine macroinvertebrates are most prominently represented.

The most important data were compiled in Table 3-5 of the report, most of which is reproduced as Appendix H to these comments. Two conclusions from these data are inescapable. First, the survival data are quite variable, because of different species, power plants, habitats, temperature regimes, and sampling techniques.

Second, an assumption of 100 percent mortality or loss of entrained animals cannot be supported by

the available data. Mean survival values for most species and taxa groups exceed 50 percent. Several taxa (freshwater (drifting) macroinvertebrates, the freshwater catostomids (suckers), and the estuarine/marine spot (croaker family)) exceeded 75 percent mean entrainment survival. Estuarine macroinvertebrates also had high entrainment survival, with a mean of 70 percent. Striped bass, white perch, and Atlantic tomcod, all important in the Hudson River, all exceeded 50 percent mean entrainment survival. The Clupeids and bay anchovy were notably low, with mean survival values around 25 percent.

Thus, the potential for AEI clearly depends on the specific assemblage of organisms in the waterbody and their susceptibility to entrainment at a given site, and site-specific analyses are required to determine the need for flow minimization and the environmental benefit to be gained.

EPA Response

EPA has adopted an approach that measures environmental performance in terms of impingement and entrainment because EPA's record shows that impingement and entrainment is an adverse environmental impact and impingement and entrainment is a more objective measure of performance.

Under Today's rule, stakeholders are given 2 options, or tracks, to choose from when building new facilities. Track I establishes specific capacity, velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment of fish, shellfish, eggs, and larvae and requires the applicant to select and implement the best technology available to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish and shellfish. Track II allows the facility to conduct a comprehensive demonstration study to show that alternative controls will meet the same impingement and entrainment reduction levels that would be achieved by a shoreline intake meeting the Track I requirements at the same site. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

Comment ID 316bNFR.068.070

Author Name Terry M. Hogan & David E. Bailey

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Subject Matter Code 12.0

Best Technology Available-Flow and Volume

Entrainment Mortality Depends on the Size of the Fish

For a given species, survival of the physical effects of entrainment of larval and juvenile fish also may depend on the size of the organism. Where large data sets exist, such as for Hudson River striped bass and white perch, they show a significant positive correlation between entrainment survival and the life stage or size of the fish (EA 1989b). For example, survival of entrained striped bass increased from 50 percent at about 5.5 mm total length to 90 percent at about 14.5 mm. In general, yolk-sac larvae had the lowest entrainment survival and early juveniles the highest.

Size has a profound effect on the potential for AEI, one that goes beyond increase in survival alone. This is because the earliest life stages of many fish species have very high natural mortality rates, which decrease as the organisms grow. Organisms that already have survived to the late post-yolk-sac larvae and early juvenile stages have a higher probability of continuing to survive and recruiting to the population. See Appendix B.

In addition, entrainment of larger organisms may be effectively reduced by methods other than flow reduction, such as screening technologies like wedge-wire screens. See EPRI Technology Review. The combination of factors may make flow minimization less protective, as well as more expensive, than other ways of reducing the potential for AEI at specific sites.

EPA Response

Under the Track II option of today's rule, stakeholders may conduct a comprehensive demonstration study to show that alternative controls will meet the same impingement and entrainment reduction levels outlined in Track I. This option allows the consideration of site-specific factors other than flow, to minimize impacts from impingement and entrainment. In so doing, EPA believes that: the two track process allows flexibility by including a performance-based alternative; and Track II provides an incentive for the development of innovative technologies (that will represent best technology for minimizing impingement and entrainment from cooling water intake structures) at new facilities.

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Author Name Terry M. Hogan & David E. Bailey

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Subject Matter Code 12.0

Best Technology Available-Flow and Volume

Entrainment Mortality Depends on Adaptation to Temperature Changes and Duration of Exposure

One factor that affects entrainment mortality is the heat to which the organisms are exposed. The tolerance of organisms to temperature elevations in the cooling water system is influenced by their genetic ability to adapt to thermal changes within their characteristic temperature range and the duration of exposure to the elevated temperature (Coutant 1972). Genetic ability to adapt to temperature changes differs both among species and among life stages of a single species (Hochachka and Somero 1971; EA 1989b; Kellogg and Jinks 1985). For example, striped bass tolerate higher temperatures than salmon, and juvenile striped bass have higher tolerances than adult striped bass (EAI 1978a; Coutant 1970). Therefore, entrainment survival may be influenced both by the thermal life histories and the thermal tolerance limits of the species susceptible to entrainment.

For example, the community in a waterbody having a narrow natural range of cool temperatures may have species assemblages with thermal tolerance zones that are narrower and lower than those in a waterbody with widely fluctuating natural temperatures. Conversely, species may migrate between waterbodies or between habitats within a waterbody to occupy seasonal thermal regimes suitable to their thermal tolerance range, or suitable to biological functions like spawning and nursery. In this sense, an organism's sensitivity to thermal stress also influences its spatial distribution and potential for involvement with the CWIS.

The duration of exposure is a crucial interacting factor in an organism's tolerance of temperature change (Coutant 1972). The tolerance of an organism to temperature changes is a direct function of exposure time and the acclimation temperature of the organism. That is, organisms tolerate exposure to greater changes in temperature if the exposure is for a short period (Brett 1952; Kellogg et al. 1984). For example, striped bass acclimated to approximately 77°F survive an increase in temperature of 18°F (i.e., exposure temperature of 95°F) for 60 minutes, but tolerate an increase in temperature of 29°F (i.e., exposure temperature of 106°F) for only 10 seconds (EAI 1978a). Therefore, depending on the ambient temperature conditions, the cooling system (delta T and transit time), and the species and life stages subject to entrainment, entrainment impact might or might not be "adverse" and might or might not require changes to the CWIS location, design, construction, or capacity.

Tolerance to the short-term (seconds to hours) exposures to temperature changes that are characteristic of entrainment also depends on the organism's acclimation temperature (Lauer et al. 1974; IA 1978; Greges and Schubel 1979; Jinks et al. 1981). Organisms acclimated to temperatures at the low end of their genetically determined range of tolerance typically can tolerate larger increases in temperature than the same organisms acclimated to temperatures near the high end (Lauer et al. 1974). For example, striped bass post-yolk-sac larvae acclimated to 68°F tolerated a 23.4°F temperature rise (i.e., exposure temperature of 91.4°F) for five minutes, whereas when acclimated to 78.8°F they tolerated only a 19.1°F rise (i.e., exposure temperature of 97.9°F) for the same exposure time (EAI 1978a). Organisms acclimated to warmer temperatures generally can tolerate higher

maximum exposure temperatures than if they were acclimated to lower temperatures. For example, as illustrated above, the five-minute TL50 for striped bass post-yolk-sac larvae acclimated to 68°F is 91.4°F, while the five-minute TL50 for the same species life stage acclimated to 78.8°F is 97.9°F.

For this reason, evaluation of the entrainment survival and the potential for AEI must consider the seasonal nature of involvement of organisms with the CWIS and the seasonal temperature regimes characteristic of the waterbody segment in which the intake is located. For example, in a warm-temperate meteorological climate, species with high tolerance of the physical stresses of entrainment may incur lower mortality if entrained during spring, when ambient temperatures are cool, than they would if entrained during summer, when ambient temperatures are much higher.

EPA Response

EPA recognizes the effect of temperature on entrainment mortality, and recognizes the seasonal nature of involvement of organisms with the cooling water intake structure as well. Track II of Today's rule allows stakeholders the option of conducting a comprehensive demonstration study to show that alternative controls will result in the same impingement and entrainment reduction levels as outlined in Track I. In so doing, the "Evaluation of Potential Cooling Water Intake Structure Effects" component of Track II allows site-specific elements (such as those mentioned by the commenters) to be factored into the evaluation process to minimize impacts from impingement and entrainment.

Comment ID 316bNFR.068.072

Author Name	Terry M. Hogan & David E. Bailey
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Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

In Cooling Towers, Entrainment Mortality is 100%

Thus, EPA's assertion that entrainment mortality for open-cycle plants is high (65 Fed. Reg. 49,072) is an oversimplification. The impact of entrainment by open-cycle systems is not as bad as EPA suggests. Moreover, the impact of entrainment by some closed-cycle cooling systems is in one sense worse: entrainment mortality in cooling towers is total.

In a closed-cycle system, the cooling water passes through the condenser and then is transported, along with any entrained organisms, to a cooling tower, lake, or pond. The water is allowed to cool before being recycled through the condenser. This cycle is continuously repeated, giving entrained organisms no chance to return to the natural waterbody except in the low-volume blowdown. For this reason, mortality in cooling towers (though not in cooling ponds and lakes) is total.

With once-through cooling systems, those with low delta Ts and rapid transit times through the system are least likely to injure or kill entrained organisms. Because a cooling tower uses only a small percentage (perhaps 5 or 10 percent) of the water that would be withdrawn into an open-cycle system at the same site, it is often assumed that the potential for AEI is greatly reduced. The truth, however, is that in comparing open- and closed-cycle systems for a given site, it is important to consider on a species/life stage level the potentially low mortality caused by an open-cycle system compared to the 100 percent mortality of a cooling tower.

EPA Response

EPA does not challenge the assertion made by the commenter that entrainment mortality in cooling towers is nearly 100 percent. However, as noted by the commenter, the cooling intake flow at a power plant equipped with a cooling tower is approximately 95 percent less than for a once-through system. Once-through systems can see significant (and in some cases, enormous) rates of mortality for entrained organisms. Therefore, on a national level, the mortality of entrained organisms at once-through plants is significantly higher than at comparably sized recirculating closed-cycle systems. See response to comment 316bNFR.206.014.

Even if Some Entrainment Mortality Occurs, it does not Necessarily Cause "Adverse Environmental Impact," and BTA Intakes that Exceed EPA's Proposal Limits are Common

Finally, even the organisms that are killed by entrainment will not necessarily amount to "adverse environmental impact." As pointed out above, the law recognizes that sacrificing even a large number of organisms may not be AEI if the population still thrives (see Part VI.A.4 above).

Experience supports this idea. Not surprisingly, since most facilities do not impair aquatic resources even though their flows are larger (in some cases much larger) than EPA proposes to allow, regulators have approved such intakes as BTA, based on a finding that they are not causing AEI.

There are many examples, from a wide variety of waters on which power plants with once-through cooling systems have been operated for many years, showing that high flow does not necessarily cause AEI. These examples clearly contradict the need for generic flow standards of the type EPA has proposed and suggest that such standards will be overprotective in many cases.

One such example is the 1550-acre Turtle Creek Reservoir in west central Indiana, which was created in 1981 to provide cooling water for the 490 MW Merom Generating Station, a steam electric plant with a once-through cooling system. Turtle Creek Reservoir provides one of the premier largemouth bass fisheries in Indiana (EA 1999a; EA 2000a). The lake is managed by the Indiana Department of Natural Resources as a trophy bass lake, from which no fish less than 20 inches can be kept. Throughout its existence, the largemouth bass population in this reservoir has accounted for a higher percentage of the biomass than any other lake or reservoir to which it has been compared (EA 1999a; EA 2000a). The lake also supports excellent populations of channel catfish and several panfish species. Largemouth bass year class strength appears to be driven by macrophyte abundance (which provides escape cover for young bass) and prey abundance (which appears to vary cyclically) (EA 1999a; EA 2000a), and entrainment/ impingement effects have never been an issue.

The situation is similar on the Great Lakes where, even with the presence of many large power plants using once-through cooling systems, sport and commercial fisheries continue to flourish. Lakes Michigan and Erie, in particular, support huge numbers of sport fishers and the attendant charter boat industry (Tanner 2000; Knight 1997). For Lake Michigan, on which 25 power plants are located, the introduction of Pacific salmon 30 years ago is considered one of the major success stories in sport fish management (Tanner 2000). To UWAG's knowledge, none of the agencies involved in managing those fisheries has identified any impact to the fisheries resulting from existing CWISs.

The story for Lake Erie is similar. Thirty to forty years ago, Lake Erie often was characterized as being "dead." Due to improvements in water quality, however, the lake now supports world-class fisheries for small mouth bass, walleye, and yellow perch (Knight 1997). The western portion of the lake, in particular, is now a popular destination not only for midwestern anglers but for anglers from

throughout the country. This resurgence and sustained improvement of fisheries would not occur if there were widespread AEI caused by CWISs.

In the Midwest, rivers like the Muskingum, the Wabash, and the Ohio support diverse warmwater fisheries. These rivers are also home to numerous large power plants. For example, the Ohio River alone has 28 once-through power plants (ORSANCO 1994). Section 316(b) studies conducted at these plants documented varying levels of entrainment and impingement. Those demonstrations predicted that the measured levels of entrainment and impingement, though sometimes high in an absolute sense (e.g., millions of larvae entrained), were not significant at the population or community level. Twenty to thirty years of subsequent monitoring has verified the accuracy of these predictions.

Long-term monitoring programs on rivers like the Mississippi (Quad Cities Plant (LaJeone and Monzingo 2000)), the Wabash (Cayuga Station, Wabash River Station, Breed Plant (Gammon 1998; EA 1989c)), the Upper Illinois (Dresden Station (EA 1992; EA 1999b)), the White River <FN 65> (Petersburg Plant, Ratts Plant, Stout Plant (EA 1987; EA 1992; EA 2000b; ESE 1987)), the Muskingum (Conesville Plant, Muskingum River Plant (EA 1991a; EA 1991b)), and the Ohio (numerous plants monitored as part of the Ohio River Ecological Research Program (Lohner 1999; QST 1999)) have documented the continued presence of diverse warmwater fisheries in these rivers. Indeed, several of these rivers have improved noticeably during the course of monitoring, due largely to improvement in water quality (Santoro 1998; Kahn et al. 1998; EA 1999b; Van Hassel et al. 1988). The continued presence of diverse, often improved fish communities in these rivers is not consistent with EPA's notion that AEI is widespread and that rigid minimum standards must be imposed to mitigate the problem. See Part VIII below.

Footnotes

65 The quality of the White River has improved significantly over the last 20 years, particularly near the Stout Plant. This improvement is attributable to the installation of advanced municipal wastewater treatment systems by the City of Indianapolis.

EPA Response

See 316bNFR.068.069 and the preamble to the final rule for EPA's definition of adverse environmental impact.

Today's final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing impingement and entrainment impacts of a cooling water intake structure. EPA expects that this final regulation will reduce impingement and entrainment at new facilities. The final rule establishes requirements that will help preserve aquatic organisms and the ecosystems they inhabit in waters used by cooling water intake structures at new facilities. EPA has considered the potential benefits of the rule; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures. The preamble discusses these benefits to the extent possible in qualitative terms.

Comment ID 316bNFR.068.074

Author Name	Terry M. Hogan & David E. Bailey
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Subject Matter Code 12.11

5% Mean Annual Flow

EPA's Proposed Proportional Flow Limits Lack a Sound Scientific Basis

For streams and rivers, lakes and reservoirs, and estuaries and tidal rivers EPA has proposed to limit new facilities to withdrawing certain percentages of the flow or volume of the waterbody. These proposed requirements are not within EPA's authority to regulate CWIS "capacity," because a requirement based on a percentage of the waterbody has nothing to do with the capacity, or any other measurement, of the CWIS.

Moreover, EPA's percentage withdrawal limits are based on the incorrect assumption that entrainable organisms are uniformly distributed throughout the waterbody.

EPA Response

EPA believes it has presented ample evidence demonstrating a significant decrease in the level of impingement and entrainment when intake flow is minimized. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment. EPA believes the intake capacity standard established under today's final rule provides an adequate level of protection and is economically practicable and technically available to all new facilities.

Comment ID 316bNFR.068.075

Author Name	Terry M. Hogan & David E. Bailey
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Subject Matter Code 12.11

5% Mean Annual Flow

EPA's Proposed Proportional Flow Limits for Streams and Rivers Lack a Sound Scientific Basis

For freshwater rivers and streams, EPA proposes that intake flow be no more than the lower of 5% of the source waterbody mean annual flow or 25% of the 7Q10. 65 Fed. Reg. 49,085 col. 2. EPA suggests that this flow limitation, along with other limits, will protect greater than 99 percent of the aquatic community from impingement and entrainment. EPA says this is analogous to the process used in its water quality-based regulatory programs.<FN 66>

There are two problems with EPA's rationale. First, EPA is not clear what it means by "protection of greater than 99 percent of the aquatic community." 65 Fed. Reg. 49,085 col. 2. Second, empirical evidence shows that rivers typically support excellent fish communities in spite of water withdrawals exceeding EPA's proposed limit. See Part VII.E above.

Footnotes

66 EPA applies this same analysis to estuaries and tidal rivers. See 65 Fed. Reg. 49,086 col. 3. Thus, EPA should consider UWAG's comment applicable across all of EPA's proposed standards

EPA Response

On the basis of supporting data presented in the proposed rule and the NODA, Track I and II of Today's rule maintain the proposed flow limitations with some changes. EPA in the final rule is justifying the requirement on a technology basis. EPA has found the requirement to be technically available and economically practical. EPA examined the performance of existing facilities (based on data from a 316b industry survey) in terms of proportional flow, and found that most existing facilities meet the proposed requirements. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet these requirements. EPA recognizes that some measure of judgment was involved in establishing the specific numeric limits in these requirements and that these requirements are conservative in order to account for multiple intakes affecting a waterbody. In particular, the 1 percent value for estuaries reflects that the area under influence of the intake will move back and forth near the intake and withdrawing 1 percent of the volume of water surrounding the intake twice a day over time would diminish the aquatic life surrounding the intake. The 5 percent value mean annual flow reflects an estimate that this would entrain approximately 5 percent of the river or stream's organisms and a policy judgment that such a degree of entrainment reflects an inappropriately located facility. Nevertheless, because they address important operation situations and appear to be achievable for new facilities, EPA believes they are appropriate to this rule.

Comment ID 316bNFR.068.076

Author Name Terry M. Hogan & David E. Bailey

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Subject Matter Code 12.11

5% Mean Annual Flow

The 99% Protection Level is Unexplained and Unsupported

EPA says it has chosen a 99% "level of protection" because that is consistent with what is used in the water quality standards programs. By this it means that greater than 99% of the aquatic community will be protected:

EPA estimates that the combination of these requirements (and the design intake velocity limitation for reducing impingement in almost all waterbody types) should result in protection of greater than 99% of the aquatic community from impingement and entrainment. This combination of requirements to establish a minimum level of protection for aquatic communities is analogous to the process employed by EPA's water quality-based regulatory programs for developing the necessary levels of protection to protect aquatic communities within the waterbody as a whole where impacts may occur. These requirements provide the minimum level of protection for designated uses that reflect the goals in section 101(a) of the CWA, i.e., "protection and propagation of fish and shellfish and wildlife and recreation in and on the water.

65 Fed. Reg. 49,085 col. 2-3. EPA has not explained what it means by "level of protection," however, or how protecting 99% of the aquatic community is analogous to the water quality-based programs. Based on the word "estimates," it may be that the 99% is just EPA's subjective judgment.

The National Guidelines for Deriving Water Quality Criteria (Stephan et al. 1985), the Water Quality Standards Handbook (EPA 1994), and the National Toxics Rule (1992) contain nothing to support the 99% figure. The National Guidelines (p. 17) indicate that the Final Acute Value (FAV) is "intended to protect 95% of a diverse genera." The FAV is divided by 2 to go from an LC50 to a concentration that "will not severely adversely affect too many of the organisms." Stephan et al. 1985.

In the National Toxics Rule, 57 Fed. Reg. 60,848 (Dec. 22, 1992), EPA notes that its guidelines "are designated to derive criteria that protect aquatic communities by protecting most of the species and their uses most of the time, but not necessarily all of the species all of the time" and goes on to note that "aquatic communities can tolerate some stress and occasional adverse effects on a few species so that total protection of all species all the time is not necessary."

So, contrary to EPA's stated intent to "establish a minimum level of protection analogous to water quality protection levels in other EPA programs," the proposed rule is actually much more restrictive than water quality protection. Water quality criteria are applied to entire waterbodies, not merely to pollutant discharge points. They are intended to provide a specific protection level to all organisms throughout most of a waterbody. And most states allow mixing zones within which standards do not apply, recognizing the limited amount of effect that mixing zones have on the aquatic community as a whole. In contrast, as to intakes, only a portion of the organisms in the waterbody are, in a physical sense, at risk of any effect.

In short, it is not clear what EPA means by a 99% "level of protection." It is not clear what reasoning EPA uses to conclude that a 99% protection level is analogous to water quality standards programs. And there appears to be no precedent for the 99% protection level in EPA's basic water quality standards documents. If anything, these water quality standards documents support the idea that some mortality is acceptable and does not necessarily threaten communities or populations. At best, EPA has not justified or explained the "level of protection" that is the foundation for the rule. At worst, there is no rational basis for the choice of 99%.

Additionally, EPA's water quality criteria guidance documents provide several mechanisms for developing site-specific water quality criteria. Thus, the water quality standards program is entirely consistent with taking a site-specific approach to § 316(b).

EPA Response

Rather than requiring/defining a 99% "level of protection", Today's rule establishes technology-based performance requirements based on a two-track approach that reflects the best technology for minimizing impingement and entrainment impacts of a cooling water intake structure. The two track approach of the final rule allows site-specific evaluations in determining the appropriate technologies to be implemented.

EPA believes this final rule will significantly increase protection for aquatic communities, the Agency has determined that the proportional flow requirements represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA examined the performance of existing facilities based on data from the section 316(b) industry survey in terms of proportional flow to determine what additional value could be used as a safeguard to protect against impingement and entrainment (especially in smaller waterbodies, where multiple intakes are located on the same waterbody, or in waterbodies where the intake is disproportionately large as compared to the source water body). EPA found most existing facilities meet these requirements. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet these requirements.

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Author Name Terry M. Hogan & David E. Bailey

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Subject Matter Code 12.11

5% Mean Annual Flow

Empirical Evidence Provides no Support for the 5%/25% Withdrawal Limits

The best way to determine if the proposed flow limits for rivers make sense is to examine actual fish communities near facilities that take in relatively high percentages of the river flow – higher than EPA's 5%/25% limits. If EPA's limits are sound, then the communities near these facilities should be impaired. Yet many waters, despite the presence of facilities that withdraw a high percentage of the waterbody, show no signs of impairment.

Three such sites exist on the Wabash River in Indiana: the Breed Plant (an older plant now no longer in operation), the Wabash River Station, and the Cayuga Power Plant. The Breed Plant, while it operated, withdrew roughly 6% of the average annual flow and 39% of the 7Q10 (AEP 1976). Fish communities near it were monitored annually from the early 1970s until 1988. These studies revealed that the section of the river on which the Breed Plant was located supported one of the nation's most diverse fish communities (Wapora, Inc. 1981; EA 1989c). The area supported over 100 fish species, and more than 70 species were commonly reported during individual study years.

The Wabash River near the Cayuga Station has a mean annual flow of 10,070 cubic feet per second (cfs) and a 7Q10 flow of 1210 cfs (Lewis and Seegert 1999). Maximum pumping capacity is 1270 cfs; thus the maximum intake flow accounts for 13% of the average annual flow and 100% of the 7Q10 flow. Percentages at the nearby Wabash River Station are similar: 10% of the average annual flow and 83% of the 7Q10 (Lewis and Seegert 1999). Section 316(b) assessments conducted at each plant predicted no impact under normal flow conditions but possible impacts for year-classes of some species during worst-case conditions at the Wabash River Station (EA 1988; EA 1989a). However, 30 years of fish community assessments by Dr. James Gammon have failed to reveal any impacts attributable to entrainment or impingement (Gammon 1998). Assessments by Cinergy biologists and other researchers (EA 1988; EA 1989a) have corroborated Dr. Gammon's findings. Thus, despite the fact that these plants take in close to 100% of the river flow during low-flow periods, no community level or population level impacts have been detected.

Results of long-term monitoring of two power plants on the Muskingum River in Ohio are consistent with the findings on the Wabash River. The Conesville Station, located near Coshocton, Ohio, withdraws 483 cfs for once-through cooling and 89 cfs for closed-cycle and other purposes, for a total withdrawal rate of 572 cfs. Mean river flow is 5033 cfs, and the 7Q10 flow is 498 cfs. Thus, the plant withdraws 100% of the river flow during extreme low-flow conditions and 11.3% of the average flow (R. Reash 2000).

The Muskingum River Plant is located near the mouth of the Muskingum River near Beverly, Ohio. Intake capacity is about 1270 cfs. Mean annual flow of the river at Beverly is about 7542 cfs, and the 7Q10 is 599 cfs (EAI 1982). Thus the plant withdraws about 16.8% of the average annual flow and 100% of the 7Q10, well above the values in EPA's proposed rule.

Despite the withdrawal of a substantial part of the river at each of these sites, no impacts attributable to entrainment or impingement have been documented on the Muskingum River. To the contrary, both areas support balanced indigenous fish communities (EA 1991a; EA 1991b). This conclusion, reached a decade ago, has been validated by 10 years of additional data gathered near these plants. All the species that were expected continue to be present, and are present in their expected absolute and relative abundances (unpublished EA field data 1991-2000).

The Tennessee Valley Authority operates four steam electric generating stations on rivers or riverine sections of reservoirs that exceed one or both (4 out of 5 exceed both) of the proposed flow criteria. TVA has conducted studies at all of these facilities and determined that there is no AEI. The state permitting authority has indicated in all four cases that the CWIS reflects BTA, and for the two facilities in which the § 316(b) demonstration was submitted directly to EPA Region IV, the Region has indicated that the location, design, capacity, and construction of the CWISs are consistent with the requirements of § 316(b).

The Kyger Creek Station near Gallipolis, Ohio, owned and operated by the Ohio Valley Electric Corporation, exceeds the flow percentages proposed by EPA. Its flow is 27.2% of the 7Q10 flow and 6.3% of the harmonic mean flow. Nevertheless, Ohio EPA approved the cooling water intake as BTA.

These are but a few examples of rivers that support excellent fish communities despite the fact that a nearby power plant withdraws percentages of the river flow far exceeding those recommended by EPA. This apparent contradiction is easily explained by recognizing that EPA's fundamental assumption, i.e., that vulnerability is directly related to the amount of water withdrawn, is erroneous.

As explained above, the vast majority of freshwater fishes have demersal, adhesive eggs and thus are not vulnerable to entrainment. Moreover, the passive behavioral characteristics of many larvae greatly reduce their risk of being entrained. Furthermore, as noted by Coutant (1999), those organisms with a life history strategy of dispersing their eggs or larvae via the drift (so-called "r strategists," Pianka 1970) generally do so in high numbers. Although such species (e.g., gizzard shad and freshwater drum) tend to be entrained in high numbers, they have adapted to high rates of early mortality. Thus, the fact that high numbers of a few species might be entrained is not necessarily cause for concern (Coutant 1999).

EPA Response

On the basis of supporting data presented in the proposed rule and the NODA, Track I and II of Today's rule maintain the proposed flow limitations with some changes.

While EPA believes this final rule will significantly increase protection for aquatic communities, the Agency has determined that the proportional flow requirements represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA examined the performance of existing facilities based on data from the section 316(b) industry survey in terms of proportional flow to determine what additional value could be used as a safeguard to

protect against impingement and entrainment, (especially in smaller waterbodies, where multiple intakes are located on the same waterbody, or in waterbodies where the intake is disproportionately large as compared to the source water body). EPA found most existing facilities meet these requirements. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet these requirements. EPA recognizes that some measure of judgment was involved in establishing the specific numeric limits in these requirements and that these requirements are conservative in order to account for multiple intakes affecting a waterbody. In particular, the 1 percent value for estuaries reflects that the area under influence of the intake will move back and forth near the intake and withdrawing 1 percent of the volume of water surrounding the intake twice a day over time would diminish the aquatic life surrounding the intake. The 5 percent value mean annual flow reflects an estimate that this would entrain approximately 5 percent of the river or stream's organisms and a policy judgment that such a degree of entrainment reflects an inappropriately located facility. Nevertheless, because they address important operation situations and appear to be achievable for new facilities, EPA believes they are appropriate to this rule.

Comment ID 316bNFR.068.078

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Subject Matter Code 12.21

Thermal Stratification

EPA's Proportional Flow Limitations for Lakes and Reservoirs Lack a Sound Scientific Basis

For a new facility locating its CWIS on a lake or reservoir, EPA has proposed to limit the facility's design intake flow to a threshold below which it will not "alter the thermal structure" of the lake or reservoir. 65 Fed. Reg. 49,086 col. 2. EPA says that this will protect the waterbody from alteration of the natural stratification, which can be caused by withdrawing large amounts of lower-temperature cooling water (generally with low dissolved oxygen) in summer. Id.

EPA does not, however, provide information that would allow an assessment of the magnitude of the perceived problem, what levels of water withdrawal could be expected to alter thermal stratification, or the types and severity of impacts to the biological community that occur when thermal stratification is altered. EPA has not identified any technology that would prevent alteration of natural stratification, has not shown that such technology is necessary to minimize AEI, has not shown that it is available, and has not shown that it is economically practicable. See Part IX.B.3 below.

In any case, there is good reason to conclude that altered thermal stratification is not a problem. The issue of altered thermal stratification in lakes and reservoirs due to power plants has been addressed by the Nuclear Regulatory Commission (NRC) as part of the development of its Generic Environmental Impact Statement for License Renewal of Nuclear Stations (GEIS 1996). Section 4.2.1.2.3 of the GEIS, which is concerned with thermal effects, indicates that thermal stratification occurs in two ways: by the discharge of heated water (not a consideration under § 316(b), which applies only to intake structures) or by the altered circulation patterns caused by pumping cooling water in and out of the power plant. Surface discharge of heated water can intensify stratification, whereas enhanced circulation (as may be caused by facilities with once-through cooling systems) may break down stratification.

Destratification can increase dissolved oxygen concentrations in deeper waters and may be a net benefit to warmwater fisheries by expanding available habitat. The GEIS cites a study in Illinois where an unheated flood control reservoir (Lake Shelbyville) was compared with a cooling lake (Lake Sangchris). GEIS 1996, p. 4-54 (citing EPRI EA-1148, R.W. Larrimore, and J.M. McNurney, "Evaluation of a Cooling Lake Fishery," Introduction, Water Quality and Summary, Vol. 7 (1980)). In contrast with the unheated lake, Lake Sangchris did not stratify in the summer. As a result, largemouth bass had a longer growing season and greater annual growth in Lake Sangchris, the cooling lake.

The GEIS also notes that the common practice of using cool hypolimnetic water from deep intakes for power station cooling, with surface discharge, may increase the size of the warm epilimnion and decrease the amount of habitat available to coolwater fish. The GEIS uses the example of thermal discharges from the Oconee Nuclear Station, which increased the annual heat load of Keowee Reservoir by one-third and lowered the thermocline from between 5 and 15 meters to as low as 27

meters. As another example, the McGuire Nuclear Station withdraws cool hypolimnetic water from Lake Norman and discharges the heated water at the surface. As at Oconee, this has the effect of increasing the size of the upper layer of warm water and decreasing the habitat available for coolwater fishes (e.g., striped bass) in the hypolimnion of Lake Norman.

Temperature modeling of Lake Norman indicated that increasing the maximum upper discharge temperature from 95 to 99 <deg>F during July, August, and September would conserve coolwater fish habitat in the Lake by allowing smaller withdrawal rates of hypolimnetic waters. This would lower the average heat content of the lake by allowing more heat to dissipate to the atmosphere from the warmer localized area. After consultation with the North Carolina Department of Health and Natural Resources, the NPDES permit was modified to allow the higher temperatures. Modeling reservoir heat budgets allows effects of thermal discharges on stratification to be predicted and used by utilities and regulatory agencies to develop the best heat dissipation scheme.

The GEIS also says that altered thermal stratification has never been a problem at most plants. At a few plants (e.g., McGuire and Oconee), the issue has been periodically re-examined and mitigated as needed by adjusting thermal discharges through the NPDES permit renewal process. Based on a review of the published literature and operational monitoring reports, the GEIS concludes that operation of the cooling system has not altered thermal stratification at most power plants with once-through cooling systems. At the small number of plants where changes in thermal stratification have occurred, monitoring and modeling studies have been used to adjust the thermal discharges, thereby mitigating adverse impacts. As appropriate, these models can take into account other thermal inputs to the receiving waterbody and therefore consider cumulative as well as individual plant effects. Consultation with the utilities and regulatory agencies during preparation of the draft GEIS, as well as their comments on the draft GEIS, revealed no concerns about the individual or cumulative impacts of cooling systems on thermal stratification. GEIS 1980, p. 4-8.

The NRC concluded that the effects of cooling system operation on thermal stratification are a Category 1 issue with a “small” level of significance. In order for the NRC to list an issue as Category 1, the analysis in the GEIS had to find that (1) the environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics; (2) a single significance level (i.e., small, moderate, or large) has been assigned to the impacts; and (3) mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation. GEIS 1980, p. 4-8. The issue is classified as a small level of significance if the environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

The NRC findings in the GEIS, then, clearly demonstrate that thermal de-stratification due to cooling water intake is a non-issue.

EPA Response

EPA believes the natural thermal stratification of a lake, if present, influence the physical and

chemical cycles of lakes, which, in turn, strongly govern their production, utilization, and decomposition. A facility with a disproportionately large water intake can adversely impact both primary and secondary production. EPA believes the intake capacity standard for lakes and reservoirs is economically practicable and technologically achievable for new facilities, and will result in an acceptable level of source water protection.

While no percentage restriction is included for lakes and reservoirs in today's final rule, new facilities located on a lake or reservoir are required to establish a maximum intake capacity that will not disrupt the natural thermal stratification or turnover pattern of the source waterbody where such stratification or turnover pattern is determined to be beneficial. EPA believes an "across-the-board" limit is unworkable for lakes and reservoirs since the concept of flow is inapplicable to a lake. In addition, EPA believes preserving some degree of the natural thermal stratification, if present, is desirable because of the increased cooling efficiency that can result. The thermal stratification standard, while different from the flow-based standards for estuaries and freshwater rivers, does limit a new facility to an intake capacity that will achieve an acceptable level of protection for the source water.

EPA expects new facilities located on a lake or reservoir to work in conjunction with the permitting authority to correctly determine what constitutes an unacceptable disruption of any natural thermal stratification or turnover pattern.

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Subject Matter Code 12.31

Request for Comment: Proportional Flow Requirement

EPA's Proportional Flow Limits for Estuaries Lack a Sound Scientific Basis

For new facilities with CWISs in estuaries and tidal rivers, EPA's proposal imposes a 1% volume limit:

The total design intake flow from all cooling water intake structures at a facility must be no greater than one (1) percent of the volume of the water column in the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level.

65 Fed. Reg. 49,086. This 1% requirement, which is illustrated diagrammatically in Appendix 2 to the preamble, is meaningless unless a time unit is specified. Given enough time, even the smallest intake will withdraw 100% of any specified volume, just as a barrel can eventually be emptied with a thimble. For example, an intake that draws one-fifth of one percent of the water column in a day will draw one percent every five days and about six percent every month. Hence, even a closed-cycle cooling system would not pass EPA's test, depending on the time period that was assumed. EPA apparently intends the duration for the 1% to be the time of a tidal cycle, and this may be inherent in the definition of "tidal excursion" ("the horizontal distance along the estuary that a particle moves during one tidal cycle of ebb and flow"), but it is not clear.

Another ambiguity arises from EPA's statement of the formulas for calculating the flood and ebb tidal excursion distances. 65 Fed. Reg. 49,098. Those formulas apparently assume a semi-diurnal tidal cycle (i.e., a change of tidal phase every 6.2103 hours). However, on the Gulf of Mexico, tides are typically diurnal, with each tidal phase lasting about 12 hours. Thus, the formulas stated by EPA would not be appropriate for Gulf water.

Instead of applying the formulas specified in the preamble, EPA notes that regulators and permittees may choose to use either the Tidal Prism Method or more complex two- or three-dimensional hydrodynamic models to define the tidal excursion. But the Tidal Prism Method may be inappropriate for some species, because it was developed to evaluate flushing in estuaries and assesses how much water is flushed out of an estuary on the ebb tide. For assessment of entrainment/impingement risks to ocean- and estuarine-spawning fish and shellfish, this method is not applicable. These species spawn in the ocean or in higher salinity areas of estuaries and are transported up estuaries rather than being flushed down them. In other words, they are transported in the opposite direction from that assumed by the Tidal Prism Method.

Use of two- or three-dimensional hydrodynamic models to define the tidal excursion can also be problematic. These models must be calibrated and verified with existing data, which may not be available. In the absence of adequate data inputs, the model results may be unreliable. And even where adequate data are available, the models are complex and expensive to use.

Even if these technical hurdles were overcome, and laying aside the point that EPA lacks statutory

authority to impose a percentage volume limit, EPA's rationale for limiting withdrawals to 1% of the volume in the immediate vicinity of the intake structure would still be arbitrary and excessively conservative, for three reasons.

First, EPA has presumed, but has provided no valid scientific basis for concluding, that estuaries and tidal rivers are more sensitive than other types of aquatic ecosystems and therefore require a higher degree of protection. In truth, as discussed elsewhere in these comments, estuaries and tidal rivers are highly heterogeneous and contain areas of both high and low biological productivity. Moreover, tidal rivers and estuaries vary greatly in size. The tidal reaches of the Hudson River and the Delaware River, for example, are each more than 200 km in length (Cooper et al. 1988; Sutton et al. 1996). A given water withdrawal rate will affect a much smaller fraction of these large ecosystems than will the same rate of withdrawal from a small bay or tidal creek.

Second, as discussed above, the proposed standard is not, as EPA claims, consistent with EPA's water quality regulation policy, nor does such a policy have any real relevance to intake structure impacts.

Third, the numbers of organisms entrained or impinged are irrelevant from a biological perspective. The important considerations are (1) the fraction of adult mortality associated with entrainment and impingement and (2) the response of the population as a whole to the loss of that fraction. As discussed in Appendix B, fish populations are able to offset high levels of anthropogenic mortality through compensatory increases in the growth, survival, and reproductive rates of the surviving organisms. But EPA's proposed rule ignores population-level responses altogether and instead limits mortality, erroneously measured by an early life stage metric, to an arbitrary fraction of the organisms present in an arbitrary volume of water.

EPA Response

In today's final rule, EPA has adopted a design intake flow criterion for facilities located on an estuary or tidal river which limits intake capacity to 1% of the volume of water defined by the distance of one tidal excursion from the opening of the intake structure. Based on the record, including the performance of existing facilities, EPA has concluded the standard is technically and economically feasible for new facilities electing to withdraw water from an estuary or tidal river.

While EPA agrees that all locations of a particular waterbody are not necessarily equally productive, EPA does not support a community- or population-based method of assessing adverse environmental impacts for new facilities. Instead, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody (i.e., littoral zone). Today's final rule adopts the two-track approach and does not set different requirements for best technology available for minimizing adverse environmental impact for different parts of estuaries and tidal rivers. For further discussion on a population-based definition of AEI, please see response to comments under subject code 9.47 of this document.

EPA is not establishing a daily, monthly or annual intake limitation for facilities located on an estuary

or tidal river because the movement of tides, and the length of the tidal cycle, varies from region to region. Rather, the 1% limitation in today's final rule applies to the volume of water present in the water column during each tidal cycle (defined as the length of time between the maximum ebb and maximum flood). As the commenter notes, areas of the northern Gulf of Mexico typically experience diurnal (daily) tidal cycles as opposed to the semi-diurnal (twice daily) cycles that are typical of the Atlantic coast. Regional differences do not need to be addressed because the tidal information published by the National Oceanographic and Atmospheric Administration accounts for any tidal variation. If the commenter were to estimate the tidal excursion distance using the simplest method discussed at 65 FR 49098, no special steps would need to be taken to address any regional difference in the duration of the tidal cycle.

In addition to variability from region to region, tidal data at a given site are not the same from year to year due to the relative locations of the sun and moon as well as other poorly understood factors. The most accurate estimate of maximum ebb and maximum flood values at a given point would involve 18.6 years of data. For the purposes of today's final rule, EPA believes the marginal increase in accuracy this data would provide is unnecessary. EPA does not believe the variability in tidal cycles from year to year presents any obstacle to implementation of the standard. EPA recommends using the most recently published tidal data available from NOAA.

While EPA presented three methods for calculating the tidal excursion, most new facilities sited on an estuary or tidal river will likely opt for the simplest method mentioned above. Calculation of the tidal excursion using this method requires no specialized training and nautical information and tide charts are readily available for all areas of the US. EPA recently used this method to calculate the tidal excursion for existing facilities that submitted information under EPA's survey questionnaire and was able to complete the exercise for 97 of the 103 facilities. The remaining six could not be completed for reasons unrelated to the method of calculation.

EPA believes it has sufficient authority to regulate intake capacity under the Clean Water Act. For further discussion of this issue, please see the response to comments under subject code 10.02.

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Subject Matter Code 13.1

Requirement of 0.5 fps

Contrary to EPA's assumption, flow and velocity of the water are not directly related to impingement. The 0.5 fps criterion in the proposed rule is likely to be too conservative for many sites, as we show below.

The structural features of a CWIS, coupled with ambient hydrologic conditions (that is, tidal-, river-, or wind-driven velocity magnitude and direction, turbulence levels) and hydraulic conditions created by withdrawing cooling water are important factors determining the potential for impingement. Several water quality parameters, mostly weather-related, are also tied to these factors. In combination with hydraulic conditions, these can influence whether fish are impinged.

A fish approaching a CWIS inlet reacts to the structure and associated hydraulic conditions based on the stimuli it receives. For a fish to avoid an intake, it must receive some stimulus or cue that triggers an avoidance response. See Appendix C. For the velocities and other hydraulic phenomena found at most CWISs, such cues appear to be lacking. This is not surprising, since the hydraulic conditions that fish experience at intakes are not substantially different from what they experience elsewhere. In most environments fish are subjected to velocities in the range of those found at or within CWISs – that is, on the order of 0.1 to 3.0 fps. Furthermore, turbulence is common in most waters, particularly waters where instream velocities are naturally high, such as tidal estuaries and rivers. Thus fish can be expected to respond to hydraulic conditions at a CWIS similarly to the way they respond to any object in open water.

Data presented by Benda and Houtcooper (1976) (DCN:1-3003-BE) on impingement at 16 power plants on Lake Michigan and its tributaries provide an example of the lack of correlation between flow rate and impingement. While the authors did not intend to correlate the numbers of fish impinged with any particular plant design or operating feature, they did supply total numbers by species and flow rates. As shown by Figure 3.1.2 in Appendix C, there was little correlation between flow and numbers impinged across all 16 plants.

Thus, a direct relationship between velocity and impingement is not supported by the available data. To the contrary, a variety of studies either indicate a lack of correlation between velocity and impingement or else identify other factors that do significantly influence the number of fish impinged. The absolute value of the velocity approaching and entering the CWIS is not a determining factor for impingement. Instead, the change in velocity, if of sufficient magnitude, and the subsequent change in hydraulic conditions (for example, rapid flow accelerations and turbulence) can provide the cues fish need to avoid the intake. This conclusion is supported by the results of a study by Loar et al. (1978), summarized in Appendix C at 36-37.

In fact, the studies show just how site-specific impingement data are: intakes of similar type, design, and location experience large differences in the numbers and species of fish impinged. This conclusion is supported by the Loar study and by a 1978 study by Page et al. In short, several studies

have led to the conclusion that velocity is not a factor in determining impingement potential; rather, complexities in the hydraulic environment of the intake influence whether fish enter an intake structure and eventually are impinged.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

See response to comment 316bNFR.206.116 for information on avoidance behaviors of fish at intakes.

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Subject Matter Code 13.1

Requirement of 0.5 fps

EPA Has Not Justified its Proposed Velocity Requirement

EPA proposes a "maximum design intake velocity" <FN 67> of 0.5 fps for all CWISs located on oceans, estuaries, tidal rivers, freshwater streams or rivers, and in the littoral zones or within 50 meters of the littoral zone in any lake or reservoir. Proposed § 125.84, 65 Fed. Reg. 49,116-18. But no single velocity value is applicable and relevant to all CWIS configurations and design; the one EPA proposes is likely to be quite overprotective. Moreover, EPA's justification for the proposed velocity limit blurs the significant distinctions between several different types of velocity values, as discussed below.

a. Types of Velocity Values and Their Relationship to CWIS Designs

The measurement of velocity relative to an intake can be computed in several different ways, and regulators have used a variety of measurements that all quality as "velocity" but are quite distinct.

A typical measurement of intake velocity is known as the "approach velocity." This term generally refers to the average water velocity measured a few inches in front of the screen and in the same direction as the general flow, which can be, but is not always, perpendicular to the screen. But the term "approach velocity" has taken on, in more recent times, a wholly different meaning. Some regulators now define an approach velocity as the velocity component perpendicular to the screen face regardless of the angle of the screen relative to the normal direction of flow (NMFS 1997) (DCN:1-5015-PR). For purposes of distinguishing this type of measurement, we will refer to it as the perpendicular velocity vector, rather than an approach velocity.

Regulators may also require measurement of sweeping velocity, which is the water velocity vector parallel and adjacent to the screen face. The sweeping velocity is important in that it may sweep fish away from or off intake screens. For its Northwest salmon screening criteria, NMFS requires that the sweeping velocity be greater than the perpendicular velocity vector (NMFS 1995) (DCN:1-5016-PR). This can be accomplished by positioning the screen at an angle less than 45 degrees relative to the normal direction of the flow.

All of these measurements differ from the through-screen velocity, which is apparently the basis for EPA's "maximum intake design velocity." Through-screen velocity is the velocity of water as it passes between the structural components of the screen. It is always greater than the approach velocity measured in front of the screen.

The velocity measurement of biological consequence in evaluating impingement varies according to the type of CWIS technology. For example, for wedge-wire screens, through-screen velocity is the most relevant measurement. The screens exclude aquatic organisms through maintenance of a low through-screen velocity, which, coupled with an ambient cross-flow of sufficient magnitude, allows organisms to escape the screen or to be passively swept by it. For angled screens, the relationship

between sweeping velocity and the perpendicular velocity vector may be most relevant. For most other types of CWIS technologies, approach velocity is the most biologically relevant measurement, because it allows the evaluator to compare the swim speeds of potentially impacted species and life stages to the velocity just in front of the screen and thereby predict whether any vulnerable cohorts will be able to escape impingement.<FN 68>

The differences in velocity measurements should be carefully distinguished and considered in developing any § 316(b) rule. EPA confuses the various measurements and ultimately draws faulty conclusions due to this confusion.

Although EPA says it "is not proposing the more stringent criteria of 0.33 fps and 0.40 fps, developed by NMFS and the State of California, respectively, because they would be overly protective," 65 Fed. Reg. 49,088 col. 2, a recent draft paper by Coutant et al. concludes that, when the criteria are presented in equivalent measures, the proposed criteria actually are more stringent than those of NMFS.

Converting the NMFS criteria and EPA's design intake velocity to common terms, Coutant et al. makes the following comparison:

Table 2. Comparison of Approach Velocity Criteria Developed by NMFS and Proposed by EPA

	NMFS criteria	EPA proposed criteria
Perpendicular velocity vector, V<sub>1, in front of 45° angled screen	0.4 fps	0.26 fps
Straight-on approach velocity, V<sub>0	0.57 fps	0.38 fps
Through screen velocity, V<sub>ts, with 75% screen porosity	0.75 fps	0.5 fps

C. Coutant et al., Technical Evaluation of the Utility of Intake Approach Velocity as an Indicator of Potential Adverse Environmental Impact under CWA § 316(b) at 29 (Draft September 2000). Thus, the NMFS criterion of a perpendicular velocity vector of 0.4 fps, when converted to a through-screen velocity value, is 0.75 fps, which is a less stringent value than EPA's proposed 0.4 fps criterion.

b. EPA's Justification of its Velocity Requirement Ignores Differences in Velocity Values

EPA builds its justification for a 0.5 fps through-screen velocity on the basis of literature recommending an 0.5 fps approach velocity. To justify its choice of a 0.5 fps standard design intake (i.e., through-screen) velocity, EPA cites to three 1970s-era government publications.<FN 69> While none of the three specifically states that the velocity values suggested are approach velocities, it was common practice at that time to use a simple approach velocity (i.e., not a perpendicular velocity vector). Further, EPA's own memorandum <FN 70> justifying its velocity requirement quotes another early guidance document that stated "[m]aximum acceptable approach velocities are on the order of 0.5 fps." EPA 200b (DCN:1-1054-TC) at 3 (emphasis added).

Although EPA acknowledges that through-screen velocity is always a higher value than approach

velocity,<FN 71> it provides no explanation why it believes a through-screen velocity value is necessary for fish protection. Its 0.5 fps through-screen velocity is unsupported by any of the literature cited and significantly more stringent than a 0.5 fps approach velocity criteria. Thus, the record lacks support for the proposed velocity standard, and EPA's statements regarding the relative stringency of the standard indicate that the Agency has not fully considered the biological ramifications of the various velocity measurements and has not properly distinguished between the measurements.

UWAG urges EPA to reconsider its velocity proposal in light of this technical information and the variety of CWIS technologies and locational factors that influence the biological relevance of velocity measurements. In general, UWAG prefers a site-specific approach to the evaluation of intake velocity but agrees that where a permittee agrees to build highly protective technologies, such a site-specific evaluation is not necessary. EPRI is working on velocity-related reports that EPA should consider before finalizing its rule. The first report reviews laboratory studies of fish exposed to various velocities. The second evaluates appropriate velocity measurements and values for individual CWIS technologies. Based on the drafts UWAG has seen, the report will demonstrate that a through-screen velocity of 0.5 fps may be overly conservative and that through-screen velocity is not the singular measurement of importance for the great majority of CWIS technologies.

Footnotes

67 EPA seemingly defines "design intake velocity" in a way that will render it essentially the same as a through-screen velocity: "the value assigned (during the design of a cooling water intake structure) to the average speed at which intake water passes through the open area of the intake screen (or other device) against which organisms might be impinged or through which they might be entrained." Proposed § 125.83, 65 Fed. Reg. 49,116 col. 2.

68 The design of the CWIS, in addition to being important in deciding the type of velocity measurement (i.e., approach, through-screen, sweeping, etc.) that is most relevant to impingement, is also important for determining the point at which to measure the selected velocity parameter. Some CWISs, for example, may have intake canals that, in combination with velocity, prevent fish in the canal from returning to the main waterbody. At such sites, the relevant point for measuring velocity may be just before the opening of the canal. Thus, it is not technically appropriate to set a uniform location for measurement of velocity across facilities. This factor, too, weighs in favor of site-specific evaluation.

69 Those publications are: John Boreman. Impacts of Power Plant Intake Velocities on Fish, Power Plant Team, U.S. Fish and Wildlife Services, 1977; A. G. Christianson, F. H. Rainwater, M. A. Shirazi, and B. A. Tichenor, Reviewing Environmental Impact Statements: Power Plant Cooling Systems, Engineering Aspects, U.S. Environmental Protection Agency, Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon, Technical Series Report EPA-660/2-73-016, October 1973; Willis King, "Instructional Memorandum RB-44: Review of NPDES Permit Applications processed by the EPA or by the State with EPA Oversight," Navigable Water Handbook, U.S. Fish and Wildlife Service, February 1973.

70 Background and Justification for Using a Through-Screen Velocity of 0.5 fps as a Threshold Criterion Value for the Section 316(b) Rulemaking Draft, June 2000 (EPA 2000b (DCN:1-1054-TC)).

71 EPA states: "[t]his [through-screen] velocity is always greater than the approach velocity because the net open area is smaller." 65 Fed. Reg. 49,088 col. 1.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

EPA also chose a national requirement in order to provide a consistent standard for facilitating

implementation given the technical availability and economic practicability of the requirement.

See response to comment 316bNFR.001.001 for information on the intake configuration.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

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Subject Matter Code 13.1

Requirement of 0.5 fps

Research Has Revealed No Scientific Basis for the 0.5 fps Requirement

Research and studies by the American Electric Power Company, described in a letter to EPA's Deborah Nagle of August 17, 1998 (Appendix D to these comments), indicate that a single approach velocity guideline is inappropriate and not scientifically defensible.

a. The Original Basis of the 0.5 fps Requirement Is Obscure

In the late 1970s an AEP biologist, Huntting Brown, attempted to track down the technical source of the 0.5 fps approach velocity guideline. Mr. Brown had noticed that federal and state agencies were applying the 0.5 fps guideline even though the citations for the source of this number could not be traced back to any research report or scientific rationale.

After noticing the 0.5 fps guideline in a report by the U.S. Fish and Wildlife Service (FWS) entitled "Impact of Power Plant Intake Velocities on Fish," Mr. Brown wrote Dr. John Boreman, author of the FWS report and a member of the FWS National Power Plant Team. The National Power Plant Team had been charged with the task of evaluating the aquatic ecological impacts of steam electric plants.

Mr. Brown wrote to Dr. Boreman that he had never seen a detailed discussion supporting the 0.5 fps guideline and asked if FWS knew of a detailed rationale. Dr. Boreman responded that the FWS did not have a detailed rationale and said that the FWS was "concerned about the lack of adequate justification for this criterion."

To this day, the 0.5 fps guideline has no sound scientific underpinning of which UWAG is aware.<FN 72> Moreover, studies conducted by AEP in the 1970s do not support it or any other generic guideline for approach velocity.

b. AEP's Research Shows no Basis for the 0.5 fps Requirement

AEP reviewed the scientific literature and analyzed the cooling water intake studies conducted at its plants and again found nothing to support the 0.5 fps guideline. The AEP research showed that intake water velocity is just one of the factors that may influence fish impingement rates. Others include the species of fish, the hydrology in the intake vicinity, the intake configuration, the water temperature, and the river stage.

The scientific literature from at least as far back as the 1940s and through the mid-1970s contains reports of fish swimming performance. One purpose of these studies was to determine if fish were physically capable of swimming away from water intakes. However, AEP's review of these fish swimming studies and experience with its own § 316(b) studies show that the ability of fish to swim

away from an intake is not the only factor influencing impingement rates. The AEP studies indicate that water temperature, season of the year, and fish species are factors that may influence impingement, and not the only ones.

Early in AEP's review of the scientific literature, it became clear that fish swimming performance varies greatly among species, within species over their life cycles, with water temperature, and with other physical and biological conditions. Enclosures A, B, and C to AEP's letter (found in Appendix D to these comments) illustrate the differences in swimming performance as these factors vary.

Enclosure A in Appendix D is a table of fish swim speeds compiled from the scientific literature. It shows that fish swim speeds increase as the fish grow larger and that the same size fish within a species can swim faster at higher temperatures. The smallest fish tested and reported in this table is the smallmouth bass. The researchers tested fish from 0.8 to 0.9 inches long in water temperatures from 5°C to 35°C. The mean swimming speeds at 5°C were 0.2 fps and at 30°C were 1.0 fps. Swimming performance diminished at 35°C, dropping to 0.8 fps. The swimming speeds of yellow perch nearly doubled when acclimation water temperatures were increased from 10°C to 25°C.

Enclosure B to the AEP letter (see Appendix D) is an excerpt from a chapter on fish swim speeds in Fish Physiology, Volume VII Locomotion (Beamish 1978). It contains tables of burst swim speeds (speeds that can be maintained for only a second or two), critical swim speeds, and prolonged swim speeds for freshwater, saltwater, anadromous, and catadromous fish speeds. As these tables show, swim speeds vary greatly among species, within species at different sizes, and within and among species over the range of burst speeds and speeds the fish can maintain for many minutes.

Enclosure C illustrates several other features of fish swimming performance. The figures that are hand-labeled "Figures A" and "B" show the variability within species at a given size range. Figure C illustrates graphically the relationship between age, water temperature, and swimming speed of one species. Fish acclimated to 20°C were able to swim nearly twice as fast as fish acclimated to 5°C.

Enclosure D contains an excerpt from the Clifty Creek Station § 316(b) report describing the methods and results of the water velocity measurements and the correlation of water velocities and other independent variables with impingement rates. Mean intake velocities were between 1.8 and 3.0 fps, with most values between 2.0 and 2.3 fps. There was no relationship between river flow and intake water velocity, and all intake water velocities were measured with all circulating water pumps operating. The differences in intake water velocity are normal variations due to the hydrology near the intakes.

Spearman's Rank Correlation test was used to test the dependent variables (impingement of all fish, gizzard shad, freshwater drum, bluegill, and white bass) against the independent variables intake temperature, median intake velocity, and river stage (as a surrogate for river flow). Also, both ranked and unranked catch statistics were compared against these same three independent variables using Pearson correlation coefficients.

The results demonstrate that river stage and intake temperature are statistically correlated with total catch and the catch of the four most abundantly collected species. The Pearson test indicates that catch is not significantly correlated with median intake velocity for any species or for total catch. The

Spearman test indicates that there is a correlation between intake velocity and total catch, gizzard shad, and freshwater drum. Collectively, the results show that "impingement catch is strongly, and directly, correlated with river stage, modestly (and inversely) correlated with intake (river) temperature, and is correlated weakly, if at all, with intake velocity."

Enclosure E is from the Tanners Creek Plant § 316(b) study report, showing the results of a statistical analysis of impingement data along with intake water velocities and other independent variables. The tables from the appendix that show several days' results of the intake water velocity data are typical of all the data gathered through the year. The intake water velocities range from 0.1 fps to 3.0 fps, with most of the values between 0.5 and 1.0 fps. The Spearman Rank Correlation Coefficient analysis was used to test the relationship between the independent variables of net change in river elevation, intake temperature, circulating water volume, and range of intake water velocity at the trash rack against the dependent variables of total number of fish impinged, total weight of fish impinged, gizzard shad, skipjack herring, freshwater drum, paddlefish, sauger, white bass, bluegill, channel catfish, and smallmouth buffalo. Only four of the eleven dependent variables (skipjack herring, sauger, bluegill, and channel catfish) were correlated with intake water velocity at the 0.05 level. Thus this study supports only weakly, at best, the common assumption in § 316(b) literature that impingement rates are directly related to cooling water flow.

As the AEP work and the materials in Appendix D to these comments indicate, many factors influence what is an acceptable intake velocity for a particular facility. Determining an acceptable intake velocity requires consideration of the fish species and fish life stages in the waterbody as well as the intake structure design. Accordingly, EPA should abandon the notion of a screening criterion based on a single national intake velocity. There is no one-size-fits-all approach velocity that can be appropriately applied as a threshold criterion; approach velocity is just one of many site-specific factors that should be considered.

Footnotes

72 EPA notes that three government publications from the 1970s recommend a 0.5 fps velocity threshold. See 65 Fed. Reg. 49,087 nn. 44-46. None of these documents, however, provides a scientific basis for the value. EPA also relies on a fish swim speed study by John Sonnichsen et al. (cited at 65 Fed. Reg. 49,087 n. 47) for support of the 0.5 fps requirements but admits "[t]he document does not state that an intake velocity of 0.5 ft/s will prevent adverse environmental impact from impingement, nor does it recommend any particular intake velocity as a criterion." DCN:1-1054-TC, p. 3. At best, EPA has documented a "professional judgment" standard that should be evaluated in light of current research and information.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

Comment ID 316bNFR.068.083

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Subject Matter Code 13.2

Request for Comment: Consideration of Less Stringent Standard

Regulatory Agencies Have Found Higher Velocities than EPA Proposes to be BTA

UWAG conducted an informal survey of its members to ask their experience with § 316(b) demonstrations in the past. The responses from UWAG members, while not comprehensive, show that a good number of intake structures have been determined to be BTA despite an intake velocity greater than the 0.5 fps prescribed by the proposed rule.

TVA, for example, has five steam electric stations with velocities greater than 0.5 fps, operating in a variety of environmental settings, which state or EPA Region IV regulators, or both, have indicated reflect BTA.

AEP power plants have intake water velocities at the intake portal and at the traveling water screens that are on average greater than 0.5 fps. Nevertheless, the following plants conducted § 316(b) studies, and on that basis state regulators determined the intakes to be BTA, notwithstanding the greater-than-0.5 fps velocity:

On the Ohio River:
Cardinal Plant near Steubenville, Ohio
Kammer Plant near Wheeling, West Virginia
Phillip Sporn Plant near New Haven, West Virginia
Tanners Creek Plant, Lawrenceburg, Indiana

On the Kanawha River:
Kanawha River Plant upstream of Charleston, West Virginia

On the Muskingum River:
Muskingum River Plant, Beverly, Ohio

On Lake Michigan:
Donald C. Cook Nuclear Plant near Benton Harbor/St. Joseph, Michigan

On the New River:
Glen Lyn Plant, Glen Lyn, Virginia

The Ohio Valley Electric Corporation and its wholly owned subsidiary, Indiana-Kentucky Electric Corporation, have two power plants with intake water velocities that are on average greater than 0.5 fps. Section 316(b) studies were conducted for both plants, and state regulators determined that the intakes were BTA. The plants, both situated on the Ohio River, are the Kyger Creek Station near Gallipolis, Ohio, and the Clifty Creek Station at Madison, Indiana.

Other examples could be found. The short time for comments did not allow a thorough search, but UWAG is confident there are a good many intake structures that have been found to be BTA by regulatory authorities despite intake velocities greater than EPA's proposed 0.5 fps.

UWAG also notes, however, that it has presented to EPA information regarding effective fish protection technologies that require a velocity higher than 0.5 fps. See Bailey 2000; see also EPRI Technology Review. An arbitrary, unsupported velocity standard of 0.5 fps would rule out several technologies that have proven effective.

EPA Response

Past permitting decisions were made using the best judgment at the time of the decision and reflect site-specific circumstances. These determinations do not necessarily bind EPA when promulgating national BTA regulations.

EPA's decision to promulgate a national 0.5 ft/s velocity standard is well-supported in the record of this rulemaking. See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Comment ID 316bNFR.068.084

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Subject Matter Code 11.13

Littoral Zone in Tidal Rivers/Estuaries

Estuaries and Tidal Rivers Are Not Composed Entirely of "Essential Habitat and Nursery Areas"

EPA assumes, for the purpose of this rulemaking, that estuaries and tidal rivers consist entirely of "essential habitat and nursery areas":

The abundance and diversity of aquatic life within the estuarine and tidal river environment (composed of protected bays, sounds, and lagoons) are generally richer than those in any other waterbody type. These areas provide an abundance of habitat, food, and refuge for the development of the early life stages of the inshore and nearshore aquatic communities, including communities of meroplankton and holoplankton.

65 Fed. Reg. 49,084 col. 2.

From a biologist's point of view, this is a vastly oversimplified picture of estuaries. It is true that many areas within estuaries support valuable aquatic resources. But it is by no means true of every square inch of every estuary and tidal river. The salinity transition zone where fresh water from streams mixes with salt water from lower zones of estuaries often has high turbidity year-round and low productivity (e.g., Hudson River Estuary, Delaware River Estuary). For example, in the Delaware Estuary, the tidal river zone with moderate turbidity and biological productivity extends from RM 133 to RM 80; the salinity transition zone, with high turbidity, variable salinity, and low productivity (0-18 ppt) extends from RM 80 to RM 50; and the Delaware Bay Zone with higher salinity, low turbidity, and high productivity extends from RM 50 to the mouth of the bay (RM 0) (EPA 1995). Ninety percent of the productivity is by phytoplankton in the open water (pelagic zone) of the Delaware Bay (Pennock and Sharp 1986). In the Delaware Estuary, submerged aquatic vegetation is virtually absent from the littoral zone and contributes little to the biological productivity of the Estuary (Sullivan et al. 1991; Velinsky et al. 1998; Schuyler 1988).

As to the abundance and diversity of estuarine aquatic life, richer abundance and diversity do not result in higher risk of adverse environmental impact, even where entrainment or impingement occur. Ecological theory has proposed that the more complex the community, the greater its resilience and stability (Pimm 1982). Moreover, some power plants equipped with shoreline cooling water intakes have been operating on bays, sounds, lagoons, and estuaries/tidal river systems for 30 years or more, and long-term monitoring of some of those waterbodies has not detected appreciable harm to populations or the aquatic community reasonably attributable to operation of the power plants (e.g., Barnegat Bay, San Diego Bay, Long Island, the Delaware River Estuary, and the Hudson River Estuary) (NJDEP 1994; CHG&E et al. 1999).

Estuarine areas vary substantially in contribution of habitat, food, and refuge both within and among estuary/tidal river systems. Typically, the amount of habitat is greatest in the pelagic zone, substantial in the tidal marshes, and least in the littoral zone. Diversity of habitat is typically greatest in the tidal

marshes, substantial in the littoral zone depending on whether submerged aquatic vegetation (SAV) is rare or plentiful, and least in the pelagic zone. Productivity (of food) is typically high in the tidal marsh zone and pelagic zone of the lower zone confluent with the ocean, substantial in the littoral zone depending on whether SAV is scarce or plentiful, moderate in the tidal river, and low in the salinity transition zone. Refuge is typically most abundant in the tidal marsh zone, substantial in the littoral zone depending in part on whether SAV is scarce or plentiful, and least in the pelagic zone.

Also, typically, species richness and diversity are lower in the pelagic zone than in the littoral zone because the littoral zone is occupied by pelagic species as well as the littoral assemblage of species. However, as EPA notes, because of spawning strategies and the non-pelagic life styles of many life stages, littoral species have reduced vulnerability to CWISs. 65 Fed. Reg. 49,084 col. 1. As a result, a properly sited and designed CWIS along a 100-foot area within an estuary poses negligible risk to populations of many littoral species, which occupy tens to hundreds of miles within the estuary.

There also are substantial differences among zones of an estuary in terms of completing life cycles and contributing to coastal fisheries (Sutton et al. 1996). Freshwater species in the tidal river zone do not contribute directly to coastal fisheries but do contribute indirectly by serving as food for recreationally and commercially important anadromous species, which spawn and use this zone as a nursery. Productivity in the salinity transition zone is low in many estuaries because of high turbidity and because the low and variable salinity regime in this zone exceeds the tolerance limits of many freshwater and marine species. As a result, this zone is near or beyond the outer limits of the geographical distributions of most marine and freshwater species. The more saline zone of the estuary confluent with the ocean provides both direct and indirect support for important fisheries both within the estuary and along the coast.

Finally, estuaries tend to have high species richness as a result of the mixing of fresh and salt waters. However, they also tend to have low equitability among species; that is, most of the high biological productivity common to estuaries is concentrated in a relatively small number of species that are uniquely adapted to the harsh and highly variable conditions typical of estuaries (CHG&E et al. 1999). These species use high reproductive potential as a strategy to survive under such variable conditions, therefore making losses of early life stage individuals less significant (Kawasaki 1980; Winemiller and Rose 1992).

Coincident with this high reproductive potential come strong density-dependent factors that act to keep these populations in check. It is these strong density-dependent processes that allow many of these highly productive estuarine species to be harvested by commercial and recreational fisheries. Thus, while estuaries can be highly productive environments, this productivity does not necessarily mean sensitivity to cooling water withdrawals. In fact, contrary to EPA's assumption, this high productivity and coincident density-dependent regulation of the population may make many species using estuaries more resistant to harvest, whether by fisheries or by power plants.

Recent assessments of the status of two important Atlantic coastal fish stocks demonstrate that apparently high levels of entrainment and impingement losses may have no measurable impacts on abundance or yield. The Hudson River, Delaware River, and Chesapeake Bay all support important spawning populations of striped bass, even though power plants that entrain and impinge striped bass are sited on all three waterbodies. Weakfish use estuaries from North Carolina to New York as

nursery habitat and are entrained and impinged at many plants. Yet recent assessments (Atlantic States Marine Fisheries Commission (ASMFC) 2000a) show that the abundance of both species has increased greatly in recent years.

Current data (ASMFC 2000a; ASMFC 2000b) indicate that both species are currently being fished at or near the target rates established by the ASMFC. These rates are intended to maintain the abundance of the stocks at a level capable of producing Maximum Sustained Yield. See Appendix B. As documented in Appendix B, mortality of early life stages of species that are being maintained at or near the MSY population size may have little or no measurable impact on abundance or yield. A corollary to this finding is that reducing existing levels of entrainment and impingement on such species will provide little or no increase in abundance or yield.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. EPA believes that there were too many issues related to whether its definitions applied broadly across the whole country for purposes of making regulatory distinctions and that such an approach entailed administrative complexity of determining what type of water applied in every instance as compared to the two track approach EPA has adopted for new facilities. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.068.085

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Subject Matter Code 11.0

Best Technology Available-Location

Site-specific Evaluation of CWIS Location is More Protective of Aquatic Life than a Categorical Rule Protecting a "Littoral Zone"

In short, EPA's criteria for "sensitive areas" are very crude measures of what aquatic areas are "productive" or "sensitive" to intake effects. The proposed rule simply assumes that all estuaries and tidal rivers and all littoral zones are places where fish are both abundant and vulnerable to entrainment and impingement. In contrast, a site-specific assessment could be more protective, because it would consider more factors that are relevant to CWIS effects.

These factors are many. See generally Appendix C to these comments. For example, a site-specific assessment asks where in a waterbody the spawning and nursery areas actually exist, rather than assuming they are in a "littoral zone." A site-specific assessment asks whether the flow in the waterbody is in one direction (so that fish downstream from the intake will not likely be entrained), whether it is multidirectional (as in an estuary, where organisms that escape entrainment on the first pass can be swept upstream for a second exposure), or whether there is little active water movement, as in lakes. A site-specific assessment asks whether the current may flow in a different direction on the bottom than it does nearer the surface of the water, and it looks at the vertical distribution of eggs, larvae, and fish in the water column. A site-specific assessment looks at the spawning characteristics and larval behavior of the species present at the site: do the fish build nests or redds, for example? Do the eggs float free, or are they attached to the substrate?

Finally, a site-specific assessment can investigate the interaction of these natural physical, hydrological, and biological features of a site with ambient temperatures and the interaction of these factors with manmade factors, such as the pressure changes and temperatures inside the plant.

EPA Response

The final rule takes a more flexible approach. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II

and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches. While EPA continues to believe that it could have established different requirements based on general information about the productivity of water bodies, EPA decided for the new facility rule that introducing separate requirements for different water bodies was unnecessary in light of the strong record support for the fact that the Track I requirements are technically available, and economically practicable, for new facilities. Furthermore, the flexibility provided by Track II whereby the applicant demonstrates that it can reduce impingement and entrainment using different technologies provides additional flexibility.

Comment ID 316bNFR.068.086

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Subject Matter Code 24.5

EEA - Estimation of Benefits

THE ASSESSMENT OF CWIS IMPACTS PRESENTED IN THE ECONOMIC AND ENGINEERING ANALYSES CONTAINS INACCURACIES AND DOES NOT PLACE IMPINGEMENT/ENTRAINMENT VALUES IN ANY MEANINGFUL CONTEXT

EPA's Analysis of Impacts

In Chapter 11 of the EEA, EPA presents information on "CWIS Impacts and Potential Benefits." There the Agency intends to summarize facts related to intake location, design, and capacity that influence the magnitude of impingement and entrainment. EEA, p. 11-1. EPA also presents some data on "CWIS impacts" for rivers, lakes and reservoirs, the Great Lakes, oceans, and estuaries. Id. For each waterbody type, the Agency describes the areas in which it believes aquatic organisms are most abundant and sensitive to entrainment and impingement. Accompanying this description for each waterbody are tables presenting mean annual impingement and entrainment values for a variety of species, derived from a limited group of facility studies. For each species, each table also presents the range of impingement and entrainment values that EPA derived from those studies.

EPA explains (EEA, p. 11-3) that the data presented in Tables 11-2 through 11-13 were developed as follows: First EPA gathered a group of 107 studies on 98 facilities, which it classified by waterbody type. The number of studies for each type of waterbody ranged from 36 for "riverine" facilities to nine for lakes and reservoirs. Then, for each facility, EPA aggregated entrainment and impingement data by summing the data for all units and averaging across the number of years studied. For entrainment, EPA apparently decided that there were not enough data from which to calculate values for "equivalent adults." EEA, p. 11-4. Thus, the entrainment numbers for "fish" represent early life stages (i.e., eggs, larvae, and/or juveniles), not adult fish.

Then, for each species on a given waterbody type, EPA apparently summed the number of organisms recorded as entrained or impinged at any facility on that waterbody type and divided by the same number of facilities (i.e., only those at which entrainment or impingement of that species was recorded) to derive species-specific mean annual impingement and entrainment values. EEA, p. 11-3. EPA also used the highest and lowest recorded species-specific entrainment and impingement values for each waterbody to represent the range of entrainment and impingement for that species. Even a brief review of the tables shows that the range of reported entrainment and impingement values for each species is enormous. See, e.g., EEA, p. 11-6, Table 11-2 (entrainment of common carp eggs, larvae, and juveniles in rivers ranges from 859,000 to 79,4000,000); EEA, p. 11-13, Table 11-10 (entrainment of Atlantic tomcod in estuaries ranges from 2,070 to 7,030,000).

Appropriately, EPA recognizes that (1) this chapter presents only limited data; (2) the data do not represent a random sample, so it would not be appropriate to summarize the data statistically; and (3) in the absence of a statistical sample, the data may not represent actual losses. EEA, p. 11-5. Thus, EPA says, the numbers should be viewed only as general indicators of the potential range of losses.

Id.

EPA Response

This comment correctly summarizes EPA's data presentation in Chapter 11 of the new sources EEBA and acknowledges EPA's caveats about data uncertainties. Additional comments on the data presented by EPA are provided by the commenters in Comment 316bNFR.068.087.

Comment ID 316bNFR.068.087

Subject Matter Code	24.5
EEA - Estimation of Benefits	

Author Name Terry M. Hogan & David E. Bailey

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Limitations in the EPA Analysis

While UWAG agrees with the caveats EPA applies to its analyses, we believe that the Agency has not recognized other limitations in its analyses. Despite the caveats, UWAG is concerned that EPA may have concluded, inappropriately in UWAG's view, that the data support EPA's assessment of the "sensitivity" of organisms in the littoral zone to entrainment and impingement and the need for more extensive regulation of CWISs in the littoral zone.

For example, in its discussion of rivers on EEA p. 11-5, EPA says that shoreline areas along river banks, consisting of shallow, weedy areas, support the highest diversity of aquatic life. Then it says that the proposed regulation "requires stricter compliance requirements for CWIS located in the sensitive littoral zone." <FN 73> Id. Here EPA apparently equates the littoral zone with shallow, weedy shoreline areas, even though, as noted above in Parts VII.D and VII.D.2, the littoral zone as a whole may not be shallow throughout, may not actually support rooted aquatic vegetation if other necessary conditions (e.g., proper substrate and flow conditions) are not present, and may extend far offshore in some waters.

Equally important, EPA apparently equates high organism abundance and diversity with "sensitivity" to entrainment and impingement. As we have shown in Part VII.D.2.c, however, many of those species that use nearshore, vegetated areas also have reproductive and life history attributes that make early life stages less vulnerable to entrainment than species that spawn in open waters. And there is no evidence that adults that use nearshore, vegetated areas are more vulnerable to impingement than species in open waters. Indeed, in its Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact (April, 1976) (1976 Development Document), p. 23, EPA suggested that placing the intake in deeper open channels could be more problematic in some cases. In general, the 1976 Development Document suggests that selecting the most appropriate location for a given intake configuration is highly site-specific. Development Document at 24, 25.

Footnotes

73 EPA does say that a notable exception to its general rule of placing CWISs offshore "is when the structure is to be located in a stretch of the river used by pelagic spawners such as alewife." Id.

EPA Response

This comment questions EPA's conclusion that littoral zones are more sensitive to the impacts of CWIS. While EPA concurs that there may be site-specific exceptions, EPA believes that the scientific literature supports EPA's conclusion that littoral zones are, in general, more biologically productive and that therefore there is a greater likelihood that intakes located in these areas will impinge and entrain aquatic organisms than intakes located in the less productive parts of waterbodies. EPA is no longer using the concept of the littoral zone in the § 316(b) regulations, and therefore some of this comment is

no longer relevant. However, EPA notes that making valid generalizations about aquatic environments is necessary for its efforts to develop a national rule for the regulation of CWIS. EPA also notes that it is addressing site-specific issues in a series of case studies of existing facilities and is determining the extent to which case study results can be extrapolated to the national level.

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Subject Matter Code 24.5

EEA - Estimation of Benefits

In addition, EPA, throughout this chapter, equates entrainment and impingement with "harm" to or losses of organisms. See, e.g., p. 11-5 (data in tables should be viewed as general representation of impingement and entrainment losses); p. 11-10 (EPA and Kelso and Milburn data give indication of possible upper and lower bounds of entrainment "losses" per facility). But, as we discuss above in Parts VII.E and VII.G.1, many organisms survive entrainment and impingement, depending on the species involved, CWIS technologies, and other facility characteristics.

EPA Response

These commenters argue that many organisms survive impingement and entrainment and that therefore EPA should not equate impingement and entrainment with "harm" or "loss." EPA notes that while some organisms may survive impingement and entrainment, at least for a few days, the reliability of estimated survival rates has been questioned because of various measurement uncertainties and sources of potential bias. Even if the results of existing studies are accepted, the data indicate that under normal operating conditions mortality can be quite high for many species. For example, studies of Hudson River species found that entrainment mortality ranged from 93 to100% for bay anchovy, 0 to 64% for Atlantic tomcod, 57 to 92% for herrings , 41 to 55% for white perch, and 18 to 55% for striped bass, depending on temperature conditions within the intake and the life stage involved (Boreman, J., L. W. Barnthouse, D. S. Vaughan, C. P. Goodyear, S. W. Christensen, K. D. Kumar, B. L. Kirk, and W. Van Winkle. 1982. The Impact of Entrainment and Impingement on Fish Populations in the Hudson River Estuary: Volume I, Entrainment Impact Estimates for Six Fish Populations Inhabiting the Hudson River Estuary. Prepared for the U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research by the Oak Ridge National Laboratory. ORNL/NUREG/TM). Based on its review of such studies, EPA believes that the preponderance of available data supports the generalization that impingement and entrainment results in "harm to" or "loss of" aquatic organisms.

After each general description of "sensitive" areas in a given waterbody type, EPA presents the tables of impingement and entrainment data and suggests that those data indicate that the species most commonly "harmed" by CWISs occur within the sensitive areas described earlier. See, e.g., EEA, p. 11-5 (species presented in Tables 11-2 and 11-3 occur in nearshore areas and/or have pelagic early life stages, traits that greatly increase their susceptibility to impingement and entrainment); EEA, p. 11-12 (many species, including migratory species, use estuaries; species represented in tables include migratory species; CWISs in estuaries directly affect both indigenous food webs and adult and juvenile anadromous fish). While UWAG agrees that some of the species EPA identifies may use nearshore areas seasonally or exclusively and that species with pelagic early life stages may be more susceptible to entrainment, this simply does not amount to proof that the entire "littoral zone," much less the estuaries and tidal rivers in their entirety, are particularly sensitive and require more stringent regulation of CWIS within them. In fact, even if EPA's conclusions were supported as a matter of logic, which they are not, UWAG does not believe that EPA could reasonably draw such conclusions from the data in Chapter 11, for a number of reasons.

First, in compiling the tables, EPA appears to have made two types of technical error. One error involves misclassification of some of the studies, by associating them with the wrong waterbody types. For example, Tables 11-2 and 11-3 include data from the Monroe Power Plant (see e.g., Cole 1978). Although the Monroe Plant intake is on the Raisin River, that river is so close to Lake Erie that the fish fauna there are considered to be an extension of the lake community. <FN 74> It is not at all representative of the free-flowing river scenario that this waterbody category is supposed to assess. Use of the Monroe data leads to the high ranking of lentic and non-representative species such as yellow perch and rainbow smelt. Similarly, Table 11-3 includes data on white perch from a study of the Hudson River (Van Winkle et al. 1980). But the part of the Hudson from which the data were collected is a tidal river mouth, under EPA's own definition, not a freshwater river. Thus, the data in Table 11-3 have little relevance to a CWIS located on a free-flowing, freshwater river. UWAG did not have the time or resources to review all 107 studies to ensure that they were properly classified. Given the importance EPA assigns to this analysis, however, we strongly recommend that EPA review those studies, correct any errors, and republish its analysis for comment.

The other technical error involves the way in which EPA calculated the means and presented the ranges. As previously noted, EPA calculated mean impingement and entrainment rates and based the range of entrainment and impingement values in Chapter 11 on data solely from studies in which entrainment or impingement of the species in question was reported. But both the means and the ranges should have taken into account the number of CWISs near which the species was likely to have occurred.

For example, some of the riverine species listed are wide-ranging and were likely to have occurred in the source waterbodies for all of the riverine facilities (once adjusted for proper classification by waterbody). For example, largemouth bass occur in rivers and lakes across the lower 48 states (Page

and Burr 1991) and thus might be expected to show up in entrainment or impingement counts at all facilities. The fact that they were reported in the entrainment counts at only one facility is evidence that this species is not particularly sensitive to entrainment. Similarly, channel catfish occur almost nationwide (Page and Burr 1991), so their appearance in the catch totals for only some subset of plants or in low numbers indicates that they are not particularly vulnerable. Several of the other species listed (such as common carp, shiner, bluntnose minnow, black bass, and sunfish, among others) are widespread and undoubtedly occurred in the source waterbodies at most of the facilities cited.

Therefore, EPA should recalculate the means in Tables 11-2 through 11-13 and revise the ranges to reflect the absence of entrainment and impingement at some facilities at which it could have occurred, given the likely presence of the species in the waterbody type in question. In some cases (e.g., largemouth bass), this may require dividing the sum of entrainment or impingement values taken from a small number of facilities by a larger number representing some or all of the facilities studied for that waterbody type and presenting ranges from zero to the high end value recorded. Rankings then would need to be revised accordingly.

Second, besides these technical errors, UWAG believes that EPA's analysis does not provide a sufficiently refined basis on which to draw any broad, general conclusions about the sensitivity of organisms within the broadly defined "littoral zone" of estuaries and tidal rivers, versus other areas of a waterbody or other types of waterbodies. Neither does it provide enough information to support the conclusion that any given technology is the "best available" to minimize AEI in all or most cases.

For one thing, the tables provide no information on where the CWISs studied were located with respect to the littoral zone or estuary. As noted above, the entrainment and impingement values recorded vary dramatically for most species, even at the estuarine/tidal river plants EPA studied. Without some comparative analysis of CWISs located within and beyond the littoral zone as EPA has defined it, these data cannot be used to draw any conclusions about the relative sensitivity of the littoral zone versus other areas. (Of course, this would be true even if all of the CWISs covered by the tables were located inside the littoral zone. Without comparative data at a given site, it is not possible to determine whether one location is more "sensitive" than another.)

Also, the tables do not discriminate among entrainment and impingement values at facilities with different types of CWIS technologies. For example, EPA concludes elsewhere in the record that flow reduction consistent with closed-cycle cooling and low design velocity are necessary to minimize AEI. But nowhere in this analysis does EPA make any attempt to assess whether and how different flows, velocities, or other intake technologies make a difference in entrainment and impingement. Of course, this might well be impossible to do using a comparison across different sites, because, as we have said above, the performance of most technologies is affected by site-specific factors. Nevertheless, we question EPA's decision not to include any discussion of the types of comparative technology assessments that likely were part of the § 316(b) demonstration documents from which many of the biological studies were taken.

Also, EPA chose to present raw data on eggs, larvae, and juveniles as representative of "fish" losses. Appropriately, the Agency recognizes that these data do not account for the high natural mortality of eggs and larvae (EEA, p. 11-4), which, as we discuss above in Part VI.A.5.b. and in Appendix B, is not "additive" with power plant effects. The same can be said for the adults of species subject to

seasonal die-offs, such as alewife, gizzard shad, and threadfin shad, which may be impinged on CWISs in large numbers, often as a result of natural mortality rather than the influence of the CWIS itself (Thurber and Jude 1985 (DCN:1-5030-PR)); see also Appendix I (discussion of D.C. Cook plant).

In any case, the life stages susceptible to entrainment are eggs and larvae. While the numbers may appear quite large viewed from the standpoint of a lay reader more familiar with mammalian reproduction, in context they may be insignificant. As aquatic biologists are well aware, for some fish species a single female may spawn a million or more eggs every year, and billions or trillions of eggs may be spawned by the population as a whole. See Appendix B. Several hundred tons of impinged alewives or bay anchovy actually represent very small numbers compared to the total population biomass of these very abundant forage species.

With respect to entrainment, although the Agency says that it did not have enough time and data to calculate equivalent adult values for each of the species and waterbodies involved, we are concerned that EPA has not made a more meaningful effort to give the public a realistic sense of what entrainment values stand for, in terms of "fish" losses. Later in this section we will use available information to provide some of that context. See Part VIII.C below.

Most critically, EPA has not placed the entrainment and impingement values into any meaningful biological or social context. This is essential to any realistic assessment of the impacts of CWISs and the likely benefits of applying any given technology.

To demonstrate why this is so important, UWAG commissioned a limited evaluation of data presented in EEA Chapter 11, based on the available information in the record.<FN 75> While the limited time available for comment did not afford UWAG the opportunity to make a comprehensive analysis, we offer the following as an example of the kind of analysis EPA could and should have undertaken.

Footnotes

74 Cole 1978 (DCN:1-3010-BE) notes that, on an annual basis, the river contributes only 20% of the CWIS flow, and concludes "[t]he rest must be drawn from the lake." Id. at 29.

75 UWAG requested, but EPA was unwilling to provide, the worksheets or tables that it or its contractors must have compiled in order to aggregate the facility data and analyze that data by waterbody type. Having that data would have facilitated UWAG's analysis greatly, by allowing us to quickly identify the studies used to derive the means and ranges for each species. We therefore question EPA's refusal to provide it, and we reiterate our original request.

EPA Response

EPA notes that the final version of EPA's regulatory framework for new sources does not include stricter compliance standards for CWIS located in littoral zones, and therefore most of this comment is no longer relevant. However, two technical issues raised by the commenter about EPA's impingement and entrainment data tables require further discussion.

One technical issue relates to the waterbody classification of two of the facilities in EPA's impingement and entrainment tables. For the waterbody classifications, EPA relied on the industry's 1995 UDI database because results from EPA's industry questionnaires were not yet available. This database indicated "river" for the waterbody type on which the intakes of Hudson River facilities are

located. EPA agrees with the commenter that this is inaccurate, since the portion of the Hudson River where the intakes are located is a tidal river. EPA has revised its data tables to place data from studies on Hudson River facilities under the “Estuary and Tidal River” classification. Similarly, EPA agrees with the commenter that although the intake of the Monroe plant is on the Raisin River, the facility is more appropriately classified as a Great Lakes facility because of the fish fauna involved. EPA has therefore revised its tables so that impingement and entrainment data for this facility are now included with data for the Great Lakes. In future analyses EPA will classify intake locations using results of its industry questionnaires. However, the final rule does not distinguish among waterbody types, so such classifications do not have a bearing on the proposed regulations.

The second technical issue raised by the commenter concerns potential bias in EPA’s estimates of annual mean impingement and entrainment expressed on a per facility basis. The commenter argues that such estimates may overestimate impacts if all of the CWIS affecting the same populations in a given waterbody are not considered, since in some cases only a small portion of the total CWIS may impinge or entrain organisms, or high numbers of organisms, resulting in a lower mean on a per facility basis. However, EPA notes that the opposite may also be true. This issue cannot be resolved because, as the commenter notes, in most cases only a subset of facilities on a given waterbody have monitored and reported impingement and entrainment. Even among those facilities that have monitored losses, there are numerous sampling limitations that make between-facility comparisons inappropriate and probably inaccurate, including a lack of complete sampling of all vulnerable life stages and species. As EPA has stressed repeatedly in the EEBA, preamble, and responses to comments, EPA acknowledges that there are numerous uncertainties associated with the data it has summarized. Nonetheless, EPA felt it was important to present data indicating the relative magnitude of impingement and entrainment to provide a context for its rulemaking efforts. While it was not possible to detail the exact CWIS configuration for all facilities examined, EPA believes that the studies are indicative of the impingement and entrainment rates likely to occur at once-through facilities.

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EEA - Estimation of Benefits

UWAG Analysis of the EPA Methodology and Data

UWAG asked Dr. Ransom Myers, a noted fisheries biologist who occupies the Killam Chair of Ocean Studies at Dalhousie University in Halifax, Nova Scotia, to select a range of species from different waterbodies for analysis. Dr. Myers prepared the analysis and arrived at the conclusions described below.

As an initial matter, Dr. Myers made a general assessment of EPA's methodology and noted the following points. First, he noted that EPA uses the annual rates of entrainment and impingement, rather than looking at the "per capita" effect of that entrainment and impingement on the affected stocks. The use of annual rates as opposed to per-capita rates is non-precautionary because, for threatened or endangered species, the annual rates will be low because the abundance of the organisms is low. Additionally, the use of the annual rates as a basis for comparison does not take into account the fact that an identical increase in the per capita mortality rate for two different species can have quite different consequences at the population level, or that mortality occurring pre- or post-compensation has substantially different effects on the stock. In short, Dr. Myers concluded that the raw numbers of fish eggs, larvae, juveniles, and adults entrained or impinged is not an adequate basis for establishing environmental "impact," even if one assumes that all entrained and impinged organisms die, which is demonstrably not the case.

Dr. Myers also noted that EPA includes in Chapter 11 a table (Table 11-1, EEA, p. 11-4) containing a partial list of characteristics influencing entrainment and impingement but does not include the stock parameters such as the maximum reproductive rate, the habitat capacity parameter, and the natural mortality rate that are necessary to estimate the population-level effects of entrainment and impingement.

Dr. Myers further noted that EPA's assessment of CWIS impacts and benefits of regulation, described at 65 Fed. Reg. 49,073-74 and 49,103-05, ignores most of the research carried out in the area of population biology and management of fish in the last 25 years. Virtually no reference is made in Chapter 11 to recent, peer-reviewed, published fisheries and population ecology literature. For example, much of the debate over power plant effects on the Hudson River in the 1970s, which EPA cites as an example of the benefits of this rule, concerned conflicting estimates of the compensatory reserve of the striped bass population of the Hudson (Goodyear 1977; McFadden 1977; Barnthouse et al. 1984; Christensen and Goodyear 1988). In those days, commercial catch and effort estimates voluntarily supplied by Hudson River fishermen were the only data available for estimating compensatory reserve. It was not possible to develop a reliable estimate of compensation from these data (Christensen and Goodyear 1988). Since 1980, comprehensive commercial fishery surveys, combined with research surveys and improved modeling techniques, have enabled fisheries scientists to develop greatly improved estimates of compensatory reserve in this species. A spawner-recruit model that quantifies compensation is now used to establish the target fishing rate for all Atlantic

striped bass, including the Hudson River stock (NMFS 1998).

Spawner-recruit data that can be used to quantify compensatory reserve are now available for a wide variety of species (Appendix B). The "compensation ratio" approach suggested by Goodyear 1977 as a means of indirectly quantifying the effects of power plants and fishing on the compensatory reserve of striped bass and other fish populations is now termed the "Spawning Stock Biomass per Recruit" (SSBPR) approach and is one of the principal methods used to manage marine fish stocks (Goodyear 1993; NRC 1998). A use of Goodyear's methods is seen in the NMFS assessment of red snapper (Lutjanus campechanus) (Goodyear 1995). The assessment provides one of the highest estimates of compensation reserve for the 57 species studied by Myers et al. 1999.

By way of illustration, Dr. Myers prepared the following analysis of the entrainment and impingement values EPA reports for various waterbodies. Due to time constraints, Dr. Myers was not able to prepare examples for both entrainment and impingement for all waterbody types. In some cases, species selection was influenced by the ready availability of life history data. Nevertheless, his analysis was intended to present a fairly representative cross-sample.

Dr. Myers emphasized that his critique was not designed to show that entrainment and impingement would never cause AEI. In fact, his research has done a great deal to refute the myth, formerly common in fisheries management, that compensation is so great that it is not important to consider egg production in order to maintain healthy fisheries (Myers and Barrowman 1996; Myers 1997; Myers and Mertz 1998; Myers, Bowen and Barrowman 1999). Rather, by examining different types of species in different waterbody types, his analysis simply illustrates the importance of understanding species-specific life history strategies and the extent of compensatory reserve in order to present such data in a meaningful context. In Dr. Myers' compensation appendix, he presents a theoretical framework and a summary of a meta-analysis of much of the world's data on fish population dynamics that allow a rational evaluation of the impact of entrainment and impingement. For purposes of this analysis, Dr. Myers assumed, as EPA does, that all entrainment and impingement results in mortality (although Dr. Myers noted that this is not true in many cases).

EPA Response

This comment by the Utility Water Act Group (UWAG) argues that EPA should discuss the impingement and entrainment numbers presented in Chapter 11 of the new sources EEBA in relation to potential impacts at the population level, and comments 316bNFR.068.091-.095 present results of population-level analyses conducted by a fisheries scientist commissioned by UWAG using the Chapter 11 data.

First, as noted in Chapter 11 of the EEBA, EPA points out that the purpose of EPA's data compilation was to provide information on the relative magnitude of impingement and entrainment, not to evaluate potential indirect effects on affected populations. EPA notes that it is not necessary to address potential indirect effects on populations to define the environmental impacts of CWIS. The impingement and entrainment of aquatic organisms are, of themselves, environmental impacts.

EPA also notes that the level of effort required to compile the data needed to model potential effects

on populations was not possible within the court-ordered time frame for developing the new sources rule. EPA is currently undertaking a series of case studies for the Phase II rule that will present more complex analyses of CWIS impacts, including potential impacts on fishery yields and other population-level endpoints.

EPA objects to the commenter's contention that EPA has "ignored most of the research carried out in the area of population biology and management of fish in the last 25 years." EPA has carefully considered this literature and notes that the many uncertainties associated with fish population modeling make such tools of limited utility in evaluating CWIS impacts for regulatory purposes. In particular, EPA notes that the fisheries literature demonstrates the failure of stock-recruitment models and assumptions about compensation to accurately predict the sustainable yield of many exploited fish stocks. A recent report by the National Marine Fisheries Service concludes that nearly a third of the 283 stocks under U.S. jurisdiction are currently below their maximum sustainable yield (NMFS. 1999. Our living oceans. Report on the status of U.S. living marine resources, 1999. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-41, 301 p.). For another third, the maximum sustainable yield remains uncertain. EPA notes that many of these stocks are also subject to impingement and entrainment losses.

In this regard, EPA notes that while there may be evidence of compensation in the Hudson River striped bass (Barnthouse, 2000), there are other cases where fish populations subject to both overfishing and CWIS losses have failed to rebound once fishing pressure was removed. This is seen in the case of the winter flounder in Mt. Hope Bay, Massachusetts. Winter flounder is subject to substantial entrainment at the Brayton Point facility, and the population has experienced a dramatic decline over the past 15 years. Even though fishing restrictions have been imposed, the population has failed to recover.

Further, as the New York Department of Environmental Conservation maintains, power plants possess no inherent right to deplete the potential compensatory reserve of a fish population. Such depletion of compensatory capacity can threaten a population's ability to persist in the face of the many natural environmental stresses that occur.

EPA notes that it is now widely acknowledged by fisheries scientists that the stock-recruitment relationship is a multidimensional process, involving many physical and biological factors that can cause the relationship to vary over times in ways that are difficult to quantify and predict (Fogarty, M.J., M.P. Sissenwine, and E.B. Cohen. 1991. Recruitment variability and the dynamics of exploited fish populations. Trends in Ecology and Evolution 6:241-246.). Such complexities contribute to the inability of fish population models to accurately predict the sustainable yield of many exploited fish species. As NMFS concluded in their recent report on the status of U.S. marine resources, "The available scientific information and the ability to implement and enforce effective management regulations have been, in many cases, insufficient to manage living marine resources at their maximum potential without incurring significant conservation risks."

In this regard, EPA notes that there is a trend towards a more comprehensive, ecosystem-based approach to fisheries management. A recent NMFS report on ecosystem-based fisheries management emphasized the need to expand single species stock-recruitment assessments to consider the broader ecological and socioeconomic context within which fish populations occur, including factors such as

the unpredictable effects of weather and climate on population dynamics, effects of harvesting, and interactions with other species (Summers, J.K. 1989. Simulating the indirect effects of power plant entrainment losses on an estuarine ecosystem. Ecological Modeling 49:31-47.). For example, though not considered by traditional stock-recruitment models, losses of forage species can reduce production and catch rates of top predators. In the case of cooling water intake structure impacts, a food web model of fish populations in the Patuxent River predicted a significant reduction (over 25%) in exploited species including striped bass, bluefish, and weakfish as a result of power plant losses of preferred prey species such as bay anchovy and silversides.

Rather than ignoring the fisheries science literature, EPA has examined information such as that provided by the NMFS reports cited above and concluded that single species stock-recruitment models cannot reliably predict if and by how much a population can remain sustainable despite I&E losses. At the same time, EPA recognizes the need to estimate potential effects of I&E losses on fishery yields for the purposes of its Phase II benefits case studies. For this purpose, EPA is applying widely accepted methods for expressing impingement and entrainment losses as numbers of adult equivalents, as foregone fishery yield, and as biomass production foregone (These methods are detailed in numerous publications, including the following industry publication: Electric Power Research Institute (EPRI). 1999. Catalog of Assessment Methods for Evaluating the Effects of Power Plant Operations on Aquatic Communities. TR-112013, Final Report, June, 1999. Electric Power Research Institute, Palo Alto, CA.). These techniques make it possible to consider the potential consequences of impingement and entrainment for fish harvests and other publicly valued endpoints to estimate the economic benefits of alternative technologies for reducing impingement and entrainment. EPA notes that by considering potential consequences for the adult population and fishery yields such analyses do, in fact, consider possible population-level consequences of fish impingement and entrainment. However, because such analyses are very complex, data intensive and time consuming, EPA did not conduct these analyses for the Phase I rule because it would have delayed the permitting of these facilities.

EPA stresses again that the data presented in Chapter 11 of the new sources EEBA were meant only to provide information on the relative magnitude of impingement and entrainment, not to evaluate potential secondary effects on affected populations. EPA believes that it is inappropriate to use these data for population-level analyses because of the many data uncertainties and potential biases outlined in Section 11.2.2 of Chapter 11. As stated by EPA in its presentation of the data, these data do not represent a statistical sample and therefore “the data should be viewed only as general indicators of the potential range of I&E losses.” As one of the commenters acknowledges, “EPA’s estimates were used primarily to understand the relative proportion of different species impinged and entrained.”

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EEA - Estimation of Benefits

Rivers

With respect to entrainment, Dr. Myers selected common carp (Cyprinus carpio) for analysis, because it had the largest mean annual entrainment per facility for the data set examined by EPA. This introduced species has enormously high fecundity, so that the high level of entrainment of eggs and larvae is not surprising. Table 11-2 indicates that approximately 20 million eggs and larvae were entrained per year on average for the power plants considered.

Carp produce approximately 100,000 fertilized eggs per kilogram of body weight, and females begin to spawn at 4 kilograms and can reach sizes of 20 kilograms (Billard 1995). Thus, the entrainment of 20 million eggs and larvae could have represented the production of only 10 or 20 females for one year. This is an underestimate, because many eggs and larvae will die before they are entrained, but many others will survive entrainment. This is consistent with many of EPA's own reports on the subject, some of which are cited in the EEA (see, e.g., Hicks 1977 (DCN:1-3029-BE)).

EPA Response

See response to 316bNFR.068.090.

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EEA - Estimation of Benefits

Lakes and Reservoirs (excluding the Great Lakes)

For lakes and reservoirs, Dr. Myers examined the impact of impingement on shads and alosids, particularly the threadfin shad (Dorosoma petenense), a species that Table 11-5 (EEA p. 11-9) says is the most highly impinged of the 15 EPA presents. Both shads and alosids are part of the family Clupeidae. Dr. Myers also examined entrainment of drum (Aplondinotus spp.), which Table 11-4 says is the most frequently entrained species in lakes and reservoirs (EEA p. 11-9).
With respect to impingement of threadfin shad, the largest number reported (1.37 million) comes from the Cumberland steam plant on the Barkley Reservoir in Tennessee (TVA 1977) (DCN:1-3077-BE). To place this number in context, Dr. Myers evaluated the estimates of population size for the reservoir from concurrent population assessments using 30 cove rotenone samples, taken from the same TVA study. These estimates resulted in a mean standing stock of 5,772 individuals per hectare for the reservoir. Thus, impingement of 1.37 million adults is equal to an impingement rate of 1%. This low percentage suggests strongly that there is no meaningful “adverse” impact.

Further analysis using simple population models confirms this conclusion. The average weight of an impinged fish was approximately 4 grams, which suggests that impingement usually occurred close to the age when compensation is occurring. Also, no fishery exists for this species. If the mortality occurs pre-compensation, one can estimate the reduction in mean spawner biomass from the impingement using Equation 10 from Appendix B, p. 42. For this, an estimate of the compensatory reserve, also known as the maximum lifetime reproductive rate, is needed. The estimated value for the Clupeidae is 17.1 (Myers et al. 1999). This number means that, at low population size, a female will produce on average 17.1 replacement females over her lifetime. (For reasons described in Myers et al. 1999, this estimate likely is biased low. A large compensatory reserve clearly exists for this species, given the rate at which the population can increase when introduced to new lakes and reservoirs.)

In any case, using the value of 17.1 to analyze the effects of impingement of 1.37 million organisms results in an estimated reduction of 0.06% for impingement of this species. Even if one assumed that the rate of impingement was greatly underestimated and actually was 5% and that the compensatory reserve was much lower (for instance, more in line with that for anadromous alewife, which has a compensatory reserve estimated at 5.7), the equilibrium spawner abundance would decline by only 1.2%, even assuming that all impingement occurs pre-compensation, when the population effect will be greatest. If all impingement occurs post-compensation, then the estimate of reduction in mean spawner biomass would be slightly less than 1%. See Appendix B, Equation 11, p. 63. In either case, it is highly unlikely that the level of impingement cited could have any “adverse” impact on the population’s ability to sustain itself and, indeed, to thrive.

Also, Dr. Myers notes that the second most common species impinged by the Cumberland Steam Plant is the freshwater drum (150,000), which is impinged at an even lower rate, 0.46% (TVA 1976)

(DCN:1-3077-BE).

Looking at impingement in reservoirs and lakes in a wider context, shads (i.e., members of the genus Dorosoma and Alosa) represent four of the top five species impinged in lakes and reservoirs. These range from a mean of 678,000 fish impinged per year for threadfin shad to 41,000 impinged for gizzard shad. This impingement can be compared directly to estimates of shad larvae per hectare of reservoir area. Gizzard shad larvae can reach densities of one million per hectare during spawning periods and commonly are at densities of over 100,000 per hectare (Houser and Netsch 1971). Given these high larval densities, the reported impingement of fish that are usually juveniles represents only a small fraction of the larval production on large reservoirs on which power plant CWISs are found.

As for entrainment in lakes and reservoirs, a review of the data underlying Table 11-4 indicates that the four highest estimates of entrainment come from the Squaw Creek Reservoir in Texas, which was built by the power company to provide cooling for a nuclear power plant (Spicer et al. 1998). Review of that study shows that the species most frequently entrained is the freshwater drum (Aplodinotus grunniens), with entrainment of approximately ten million eggs and five million larvae. The drum is unique among freshwater fish in North America in that it has buoyant eggs, which makes it particularly vulnerable to entrainment. The species also has extremely high fecundity and a large compensatory reserve. For example, female drum weighing between 3.6 to 5.9 kg in Wheeler Reservoir in Alabama averaged 686,000 eggs.

The high compensatory reserve for drum is shown by the difficulty in eliminating them (which has been attempted because some fisheries managers believe they compete with more desirable game fish). In Lake Winnebago, Wisconsin, for example, fisheries managers mounted an eleven-year effort to remove drum from the lake. At least 680,400 kg of drum were removed annually between 1955 and 1966, without a significant change in catch per unit effort – clear evidence that drum have high levels of compensatory reserve (Priegel 1971).

EPA Response

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EEA - Estimation of Benefits

The Great Lakes

Dr. Myers examined the impact of impingement and entrainment in Lake Michigan because it is entirely within the jurisdiction of the United States, supports the largest number of power plants (25), and is one of the best studied of the Great Lakes. For purposes of his analysis, Dr. Myers used both the cumulative impact assessment values compiled by Kelso and Milburn (Kelso and Milburn 1979), presented in Tables 11-7 and 11-9, and EPA's estimates, presented in Tables 11-6 and 11-8. See EEA, p. 11-10 to 11-12. EPA's estimates were used primarily to understand the relative proportion of different species entrained or impinged. Thus, the fact that EPA's entrainment estimates include eggs and larvae while Kelso and Milburn's do not, should not undermine the analysis.

As to impingement, Kelso and Milburn estimated that a total of 15.4 million fish are impinged each year in Lake Michigan (Kelso and Milburn 1979). While this seems like a large number, it has to be put in context of the total ecosystem.

First, almost all of the impinged fish in the Great Lakes are forage fish, which are part of the aquatic food chain but typically are not harvested for human consumption. The most commonly entrained fish by far is the alewife, which is not native to the Great Lakes. The alewife is a planktivore, meaning that it primarily consumes plankton.

Dr. Myers converted the numbers of fish entrained into biomass in order to compare them with the commercial harvest estimates obtained by the Great Lake Fisheries Commission (Baldwin et al. 2000). Data from the five power plants on Lake Michigan for which EPA reported data were used to obtain the average weights per impinged fish (Thurber and Jude 1985 (DCN:1-5030-PR); Benda and Houtcooper 1976 (DCN:1-3003-BE)). The average weight of a fish impinged in that facility varied among years but typically was around 30 grams. Thus, the biomass of forage fish impinged in Lake Michigan by the 25 power stations should be around 461 metric tons a year. By comparison, the total biomass of planktivores in Lake Michigan is between 0.5 and 0.8 million metric tons (or 1.2 to 1.7 billion pounds) (Borgmann 1987; Sprules et al. 1991; Eshenroder et al. 1995). That is, the biomass of forage fish impinged in Lake Michigan represents a mere 0.07 percent of the estimated standing stock in the Lake.

Dr. Myers explored the significance of the reported impingement by comparing the impingement of alewife, the most commonly impinged fish by far according to EPA's Table 11-8, with the commercial catch of this species (which typically is used only for fertilizer) (Emery 1985). Since alewife made up around 75% of the impinged fish in Lake Michigan (see Table 11-8), the biomass of impinged fish should be around 346 metric tons. This can be compared with the 22,000 metric tons of alewife harvested in Lake Michigan in 1977. In short, the percentage cropped is only about 1.5%. It is improbable that such a low percentage cropped could have any meaningful effect either on the species directly affected or species higher in the food chain.

As for entrainment, Kelso and Milburn (1979) estimated that 196 million fish larvae were entrained in Lake Michigan by the 25 power station CWISs operating on the Lake. Approximately 80% of the entrained larvae were alewife, according to EPA's Table 11-6. Thus, the entrainment of larvae should be around 150 million larvae.

Even though the data are rather limited, it is possible to estimate the impact of this level of entrainment on the population. To do so, it is important to know approximately what proportion of the total mortality of a cohort the entrainment represents. Using several sources of data, Dr. Myers developed four independent estimates of the order of magnitude of the alewife spawning population. Although none of the four estimates is perfect, they serve to bracket the possible range of population sizes.

First, he looked at trawl surveys undertaken by the United States Fish and Wildlife Service (FWS) to estimate the abundance of alewife in Lake Michigan during the period that Kelso and Milburn reviewed. During the 1970s, the surveys estimated around 85,000 metric tons of alewife were available to the bottom trawl surveys. In order to use this number, one must adjust for imperfect sampling gear efficiency (that is, the inability of the gear to collect every fish in the area sampled). This estimate, for alewives collected by bottom research trawl, is available (Edwards 1968). Edwards found that 60% of alewives were not close enough to the bottom to be caught by bottom trawls, and 10% of those that encountered the gear escaped. After these adjustments, the biomass of alewife of a size that would be caught by the trawl was approximately 314,000 metric tons during the 1970s. This estimate likely is biased low, because only a portion of Lake Michigan was surveyed. If one assumes that roughly half the alewife surveyed were females (a reasonable assumption that is commonly used for analyses of this kind) and half of these were mature (also reasonable, given that smaller fish are not caught effectively by the trawls) with a mean weight of 30 grams, then this results in an estimate of 2.6 billion mature females.

Second, Dr. Myers noted that an enormous die-off of alewife in Lake Michigan occurred in 1967, when 70% of the alewives died (Wells and McLain 1973). Aerial surveys and beach counts resulted in estimates that "several billion fish" had died. Most of these fish were mature (Brown 1968; Brown 1972). This suggests a population of between 0.5 and 1 billion mature females during this period.

Third, Dr. Myers made a rough estimate of the biomass from the exploitation rate. Fisheries biologists working with the Great Lakes Fisheries Commission suggest that the harvest in 1977 of 22,000 metric tons had little effect on the population (Emery 1985). It is unlikely that the fishing mortality could have been higher than 20 percent, given that sustainable levels of forage fish cannot exceed their natural mortality (Mertz and Myers 1998). Taking into account that the mature female alewife weighs about 30 grams, this suggests a population of mature females of around 1.8 billion.

Fourth, Dr. Myers used the estimate of biomass of planktivores referred to above. Given the predominance of alewife as a percentage of this biomass during this period in Lake Michigan, it is reasonable to conclude that at least 10% of the biomass of planktivores were mature female alewives, implying a spawning biomass of at least 50,000 to 80,000 metric tons of spawning females, or 1.7 to 2.7 billion females. The estimate of 10% used here is probably low, given the dominance of alewife in the system.

Fifth, acoustic surveys conducted in the fall of 1973 estimated that there were 2 billion pounds of age 1 and older alewives in Lake Michigan.

These five independent estimates, while not exact, suggest that there were between 0.5 and 2.7 billion mature female alewife in Lake Michigan during the period that Kelso and Milburn studied. Alewife in the Great Lakes typically produce around 11,000 to 22,000 eggs per year (Norden 1967). To be very conservative, we will use the lower figure of 11,000. Thus, the egg production in Lake Michigan should be between 5,500 and 29,000 billion (i.e., 55 - 290 trillion) eggs per year. In this context, even if one were to assume that only one in a thousand eggs survived to be cropped by entrainment, the 150 million larvae entrained each year represent a mortality of between 0.5 and 2.70% a year. This low pre-compensatory mortality would have almost no effect on a species such as alewife which has a high compensatory reserve (Myers, Bowen and Barrowman 1999).

As EPA noted, Kelso and Milburn examined only larvae and ignored the entrainment of eggs. They probably did this because only a subset of plants recorded entrainment of eggs and identified them to species. Dr. Myers obtained a total estimate of eggs by examining the ratio of eggs entrained to larvae for plants that have both types of data. He used data from four Lake Michigan plants that recorded both in order to make this extrapolation (Michaud 1998) (DCN:1-3049-BE). The ratios of eggs to larvae ranged from 11.2 to 5.14. Using the upper value results in a positively biased (that is, high-end) estimate of 1.68 billions eggs entrained a year. This represents between 0.0058% and 0.03% of the total alewife eggs produced each year in Lake Michigan. Again, these estimates suggest that it is highly unlikely that annual entrainment of alewife could be causing meaningful effect at the population or community level.

EPA Response

See response to comment 316bNFR.068.090.

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Subject Matter Code 24.5

EEA - Estimation of Benefits

Estuaries

For estuaries, Dr. Myers examined the mean impingement reported for Gulf Menhaden (Brevoortia patronus), the species identified in Table 11-11 (EEA, p. 11-13) as most frequently impinged. The most recent stock assessment for this species (Vaughan, Smith and Prager 2000) shows that the stock has increased substantially in abundance since 1964 and is one of the largest fish stocks in the Gulf of Mexico. Typically, around 200 billion Gulf menhaden survive to age 1, and the biomass of spawners is usually around 200,000 metric tons. Spawners typically produce around 80 trillion eggs per year. In this context, the impingement of 76 million fish, primarily young-of-the-year, is not a significant number.

EPA Response

See response to comment 316bNFR.068.090.

Comment ID 316bNFR.068.095

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Subject Matter Code 24.5

EEA - Estimation of Benefits

Oceans

For oceans, Dr. Myers examined the implications of entrainment of Atlantic mackerel (Scomber scombrus) eggs as reported in Table 11-12 of the EEA, p. 11-15. This species was chosen because a reviewed stock assessment exists for this species. Table 11-12 reports that the Seabrook Station in New Hampshire entrained 312 million Atlantic mackerel eggs (although the study EPA appears to cite (Jacobsen et al. 1998) includes a lower estimate of 270 million eggs). Using the higher value that EPA reported, Dr. Myers compared number of eggs entrained to the egg production from the Atlantic mackerel stock in the region. Estimates of spawning biomass during the period in which those entrainment estimates were made (1990 to 1997) were approximately 2,000,000 metric tons (NMFS assessment, Woods Hole 1996, Woods Hole Reference Doc. 95-18). Dr. Myers made a rough estimate of egg production, using the assumption that half the biomass was female and each female produced around 800,000 eggs per kilogram of spawning female (Scott and Scott 1988). Thus, the egg production per year for Atlantic mackerel for the Northwest Atlantic stock should be around 800,000 trillion eggs. The eggs entrained by the power station each year cited in the EEA are thus less than one millionth of the eggs spawned in a year.

EPA Response

See response to comment 316bNFR.068.090.

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Subject Matter Code 10.0

Best Technology Available

EPA'S PROPOSED PERFORMANCE STANDARDS LACK TECHNICAL ANALYSIS AND SUPPORT AND EXCEED THE AGENCY'S JURISDICTION

Even if Uniform Technology Standards Could Be Justified, EPA Must Do a Meaningful Comparison of Alternative CWIS Technologies Before Determining Which Are the "Best Available"

EPA says that it has decided that § 316(b) should be implemented for new sources by establishing rigid, nationally applicable, minimum technology-based performance standards to minimize "adverse environmental impact" – a term which it seems to equate with entrainment and impingement. See 65 Fed. Reg. 49,079. This, EPA suggests, will be much clearer, more consistent, and sparing of administrative resources than the site-specific approach used by state and federal permit writers for the past 20+ years. Id.<FN 76>

Even if setting national minimum standards were an appropriate course of action, UWAG believes that EPA has not performed even the minimal analysis of alternatives necessary to show that the technology-based performance standards it proposes reflect the best technology available. In setting technology-based standards, EPA typically (1) evaluates the technological alternatives for a given industry category or subcategory by examining what technologies are in use; (2) identifies their technical feasibility and costs, including any conditions that would limit their availability; (3) identifies the level of performance the technologies determined to be "available" can achieve; and (4) sets the effluent limit or standard to reflect the "best" level of performance identified for a pollutant or group of pollutants, taking into account costs. See, e.g., EPA, Development Document for Effluent Limitations Guidelines and Standards and Pretreatment Standards for the Steam Electric Point Source Category (November 1982).

But there is no evidence that EPA followed this standard approach here. Instead, EPA appears to have "backed in" to its proposed performance standards by first identifying the attributes of the parameters (primarily flow and velocity) it wanted to regulate and the levels it desired to achieve, without ever thoroughly evaluating and comparing available CWIS technologies, their performance with respect to the relevant endpoint – fish protection – or their costs. See, e.g., 65 Fed. Reg. 49,085 ("flow and volume are parameters that can be regulated to minimize adverse environmental impact"); 49,087 ("EPA considers velocity one of the more important factors that can be controlled to minimize adverse environmental impact at cooling water intake structures").

Footnotes

76 Of course EPA does not say, except by implication, how it has interpreted "AEI" for purposes of setting these standards or what is the basis for that definition. Although EPA's proposed rule does not include a proposed definition of AEI (65 Fed. Reg. 49,074 col. 2) and the Agency says one may not be necessary, both the preamble and the EEA, p. 2-4, say that AEI occurs when impingement and entrainment occur, suggesting that to EPA any entrainment or impingement equals AEI. Alternatively, EPA appears to suggest that AEI is "minimized" when technological requirements protect 99% of the aquatic community (although, as noted above, EPA never says how it determined that this level of protection applied). 65

Fed. Reg. 49,085 col. 2. Whether this suggests that EPA views a loss of 1% of the aquatic community as the threshold of AEI, or whether it merely concluded that no further minimization could be achieved, is not clear.

EPA Response

Even though this rule is not an effluent limitation guideline, EPA has considered the appropriate factors, including those noted by the commenter, for establishing BTA in the context of intakes at new (i.e., not yet built) facilities, the availability or limits on new facility CWIS data, and the requirements of section 316(b). The two-track approach published today is essentially a technology-based rule which addresses the need for establishing national capacity, velocity, and capacity- and location-based proportional flow requirements and design and control technology requirements to minimize impingement and entrainment, while also providing the flexibility to determine technology requirements based on site-specific parameters. This approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of also allowing flexibility by including a performance-based alternative.

EPA did evaluate available CWIS technologies and believes that the analysis shows that the technology-based performance standards promulgated today reflect the best technology available. In Section V.B.2 of the final rule entitled "What Technologies are Available to Meet the Regulatory Requirements" EPA presents information on alternative design and construction technologies for cooling water intake structures. For new facilities subject to this rule EPA chose the two-track option as the Agency believes it represents the best technology available for minimizing adverse environmental impact. With respect to new facilities, the technologies used as the basis for this option are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts.

EPA maintains that velocity and flow are very important factors that can be controlled to minimize adverse environmental impact at cooling water intake structures. EPA has examined the flow requirements of the rule and has found them to represent the most effective technology for reducing entrainment. Data was presented in the Docket for the proposed rule that showed facilities that install closed-cycle wet cooling towers could achieve a reduction in flow of between 70 and 98 percent (see Docket # 1-1073-TC) . This would equate to the same level of reduction in entrainment.

EPA has examined the technical feasibility of the required through-screen velocity of 0.5 ft/s. This requirement relies on the appropriate design of the intake structure relative to intake flow to reduce velocity or installation of certain hard technologies (e.g., wedgewire screens and velocity caps) to change the configuration of the structure so that the effects of velocity on aquatic organisms are minimized. EPA's record demonstrates that these designs and technologies are widely used in the industries subject to this rule. Since there are a number of intake technologies currently in use that are designed to meet a 0.5 ft/s through-screen velocity, the technologies that can achieve the Track I velocity technology-based performance requirements meet the criterion of best technology available commercially at an economically practicable cost.

The Agency also reviewed available data from the section 316(b) industry survey with respect to the velocity requirement § 125.84(b)(2). The preliminary results suggest that more than two-thirds of combined cycle and coal-fired electric generating facilities built within the past 15 years would meet the velocity requirement. Moreover, a review of the NEWGen database showed that, of the facilities

in the scope of today's final rule, most facilities for which information on cooling system technology is available have design intake velocities of 0.5 ft/s or less. These currently operating facilities demonstrate that a design intake velocity of 0.5 ft/s is achievable and provides for sufficient cooling water withdrawal.

EPA finds the proportional flow limitations established in the final rule to represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA believes these requirements will significantly increase protection for aquatic communities. Proportional flow limitations entail environmental benefits such as protection of aquatic life and enhancement of commercial and recreational uses of source waters. Larger proportionate withdrawals of water may result in commensurately greater levels of entrainment. Entrainment impacts of cooling water intake structures are closely linked to the amount of water passing through the intake structure, because the eggs and larvae of some aquatic species are free-floating and may be drawn with the flow of cooling water into an intake structure.

EPA examined the performance of existing facilities based on section 308 questionnaire data in terms of proportional flow in order to determine what additional value could be used as a safeguard to protect source waters against entrainment, especially in smaller waterbodies or in waterbodies where the intake is disproportionately large as compared to the source water body. In order to assess the performance of new facilities in meeting these requirements, EPA examined the performance of existing facilities and determined that 90 percent of existing facilities in freshwater rivers and streams and more than 80 percent of existing facilities in estuaries or tidal rivers meet these requirements.

The performance requirements established in this rule do not exceed EPA's jurisdiction. The requirements contained in the preferred two-track approach meet the requirement of section 316(b) of the CWA that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. See the preamble to the final rule.

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Subject Matter Code 10.0

Best Technology Available

Although EPA clearly was aware that a wide variety of fish protection technologies for CWISs exist and have been used with success at various sites, it made no attempt to collect empirical data with which to assess and compare the applicability, performance, costs, or benefits of most of those technologies. See 65 Fed. Reg. 49,093-94; SAIC CWIS Technologies Report<FN 77> (DCN:1-2109-EA); SAIC Supplement (DCN:1-5070-PR). Instead, EPA's consultant, apparently on the eve of the deadline for issuing the proposed rule, prepared a cursory analysis of CWIS technologies that eliminated the vast majority from consideration for costing purposes, without adequate reason or explanation. See SAIC Cost Research Report (DCN:1-4045-EA).

In Appendix A of its report, SAIC presents a superficial evaluation of 40 technologies, not including approach velocity flow reduction options or cooling towers. Of these alternative technologies, only three – modified traveling screens (Ristroph screens), cylindrical wedge-wire screens, and velocity caps – were selected for cost analysis. Cooling towers, which are not a CWIS technology, also were selected. Throughout its discussion of the proposed performance standards, EPA says that these three technologies are the only ones it found to be potentially effective, practicable to install, and cost-effective. Cost Research Report, p. 5. In fact, there is a wide array of other candidate technologies available to reduce entrainment and/or impingement.

The following table analyzes information from Appendix A of the Cost Research Report to illustrate the flaws in SAIC's minimalist and purely subjective analysis:

TECHNOLOGY
REASON GIVEN BY SAIC FOR REJECTION
REASON TECHNOLOGY SHOULD HAVE BEEN CONSIDERED
<table reproduced below using format listed above>
Angled traveling screens with fish bypass and return
No clear reason for rejection
In operation at CWISs; proven effective
Passavant screen
No advantage over conventional
Greater screening area may reduce organism injury in high debris locations
Dual-flow screen
No increase in impingement survival over conventional
In operation at CWISs; O&M advantage at some sites may make it preferred over conventional screen
Horizontal screen
No improvement in fish protection
Used widely in Europe; deserves consideration in U.S. for positive features cited by SAIC
Fixed screens
Long impingement times . . . result in total mortality of fish

In operation at CWISs; can be designed to minimize impingement of fish
Bar rack
Serve as barrier to large fish but do not protect smaller fish
Common feature at CWISs; useful in combination with other technologies as first line of defense
Eicher screen
All positive statements by SAIC except limited operational experience
In fact, the Eicher screen is designed for hydro application; however, the Modular Inclined Screen, which SAIC does
not include in the table, is equally promising for CWIS application.
Perforated pipe
Clogging, frazil ice, biofouling & removal of debris can be problems
These are the same concerns listed for the wedge-wire screen that was selected by SAIC for cost analysis.
Porous dike/leaky dams/leaky dikes
Predation of organisms screened out may offset effectiveness; limited to small flow intakes
No basis; in use at CWISs,including large flow intakes
Louvers
Installation costs may be high; species-specific testing needed; water level changes must be minimized; requires use of
fish handling devices
In use at one CWIS; data available for many species; water level variations typical at many CWISs not an issue; fish
handling is no more complicated than with modified screens which SAIC selected
Barrier nets
No clear reason given by SAIC for excluding this technology
Can be highly effective in blocking passage of juvenile and adult fish; have been used at CWISs; at p. 6, SAIC cites
Maryland Power Plant Research Project conclusion that physical barriers, including nets, are most effective and
economical for reducing both entrainment and impingement.
Behavioral barriers (air bubbles, lights, sound)
Species-specific; limited or inconsistent effectiveness
Can be used in combination with each other and other technologies to reduce impingement; species-specificity is not a
reason to reject a technology

In short, instead of doing a systematic analysis of potentially available technologies based on real-world data, EPA has made only a token effort to "evaluate" other alternatives. This analysis did not assess the levels to which these technologies can reduce entrainment and impingement mortality, in cases where levels of mortality are expected to cause AEI. Nor did EPA try to determine whether those technologies would achieve acceptable levels at far lower cost, which UWAG believes they would in many cases.

Not only has EPA set "BTA" performance standards without doing any meaningful analysis of alternative technologies, it also has set the performance standards in a fashion that ensures they

cannot be met using any technologies except those it has specified, even if some alternative would have an equal or otherwise acceptable level of performance in terms of reducing entrainment and impingement or protecting the population. For example, EPA has set performance standards for total intake flow that can be met only by either installing some form of recirculating cooling system or reducing the capacity of the facility drastically (an option that, as we discuss above in Part III.D, UWAG believes EPA lacks authority to require).

Yet EPA suggests that any number of technologies, including intake screen systems, passive intake systems, diversion or avoidance systems, and fish handling systems, could somehow be used to meet the flow velocity and other "regulatory requirements" imposed by the rule. 65 Fed. Reg. 49,093-94. As EPA must be aware, none of the technologies it identifies reduces total flow, so none could satisfy EPA's flow reduction standard, even if it produced equivalent environmental benefits, especially when benefits are viewed at the population level. The same is true of EPA's percentage flow withdrawal standards. And only a small handful of the technologies EPA has identified could produce any reduction in velocity. (In fact, as discussed above in Part VII.G.4, at least one effective technology requires higher velocities to operate effectively). Thus, EPA's suggestion that new facilities can choose from a wide range of technologies is hollow.

Footnotes

77 After learning of the existence of the Technologies Report in 1994, UWAG submitted letter comments on it. UWAG Comments on SAIC Background Paper No. 3: Preliminary § 316(b) Regulatory Development, dated September 27, 1994 (DCN:1-7035-EF). EPA does not appear to have asked SAIC to correct the record to reflect those comments.

EPA Response

The document referenced was used to support costing for the proposed new facility rule, but was not intended to constitute a comprehensive review of technology efficacy and cost. In the document, EPA selected several technologies that were reasonable, given data available for new facilities, for purposes of performing cost analyses for new facilities. EPA's record, as a whole, fully considers available data on technologies that can be used to address the location, design, construction and capacity of cooling water intake structures. EPA has reviewed hundreds of documents and papers that contain information on the design and efficacy of cooling water intake structure technologies. Documents which summarized EPA's knowledge were developed and placed in to the record. (See Preliminary Regulatory Development Section 316 (b) of the Clean Water Act —— Background Paper Number 3: Cooling Water Intake Technologies and Supplement to Background Paper 3: Cooling Water Intake Technologies in Docket #1-5069-PR and #1-5070-PR). In addition to the numerous documents that have been placed in the docket, EPA developed documentation that summarizes available information on the efficacy of technologies (see the Technical Development Document).

EPA has evaluated the data that is available on the efficacy of technologies and has determined that it would not be appropriate to specify technologies that would be comparable and could meet the reduction in impingement mortality and entrainment that can be achieved by meeting the Track 1 requirements. EPA agrees that there are technologies that have the potential to reduce impingement and entrainment to levels that are comparable, however, the literature does not support that these reductions can be achieved at every facility, for every source water condition, and for every species. In fact, the literature states just the opposite (see Docket # in Docket #1-5069-PR and #1-5070-PR, the Technical Support Document). Thus, EPA believes the efficacy of these technologies should be

evaluated on a case-by-case basis as is possible under Track II of today's rule.

EPA understands that the commenter views some technologies as equally effective as the technologies upon which the Track 1 requirements are based. EPA does not believe the record supports this across the board for a number of reasons. However, there may be places where these alternative technologies do reduce impingement morality and entrainment comparably to the Track 1 requirements; thus the rule authorizes permit writers to allow a Track II suite of technologies to be applied where this is demonstrated. An example of where the proposed technology, e.g., wedgewire screen would not fit across the board as equivalent to dynamic flow requirements would be an area where there is high debris loading, attached growth, or where the appropriate counter-currents do not exist. Also, the technology may not be appropriate for large facility application as they have never been installed. However, in certain areas, that meet the limitations of the design, it may be demonstrated to be equivalent. Regarding the gunderboom, EPA does not yet believe that it is an adequately demonstrated technology, see elsewhere in this comment response document; however, it may work in all waterbodies where there is limited wave action and where the barrier can be maintained in place. Finally, the fine mesh traveling screens and fish handling systems offered by the commenter may not generally equal to the Track 1 requirements because survival is highly species-specific and life-stage dependent.

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Subject Matter Code 10.02

Authority to Limit Intake Flow

EPA Has Based Its Minimum Generic Performance Standards on Erroneous Interpretations of Law and Fact

How, then, did EPA arrive at its proposed performance standards? While EPA's description of what it did is not entirely clear, here is what it appears to have done. As the following discussion shows, UWAG believes that EPA's proposal contains errors, both of fact and of law.

EPA's Intake Flow Limits Are Legally and Technically Flawed

As to total flow volume, EPA appears to have decided that significantly decreasing flows would significantly reduce entrainment; assumed that this would reduce entrainment mortality; and determined that the desired level of intake flow could be achieved using one of two approaches – wet recirculating cooling or dry cooling – which involve the design and operation of the circulating water system, not the CWIS. 65 Fed. Reg. 49,080, 49,087. Having concluded that the costs of dry cooling would be prohibitively high and are not justified by any incremental reduction in environmental impact that might be achieved (a conclusion with which UWAG agrees), the Agency then used wet recirculating systems to express a limit on "intake flow." This is not the way BTA is supposed to be determined under § 316(b).

EPA also asks for comment on whether the rule should specify that make-up and blowdown must be "minimized."<FN 78> 65 Fed. Reg. 49,087. Notably, the proposed rule says that the facility must "reduce" its intake flow "to a level commensurate with that which can be attained by a close-cycle cooling recirculating cooling water system" <FN 79> but does not say exactly what that level is. See, e.g., proposed § 125.84(b)(3)(iii), 65 Fed. Reg. 49,117 col. 3. While the preamble suggests that wet recirculating cooling systems can achieve a range of flow "reductions" (presumably reductions from the level of flow occurring at a facility using a once-through system), depending on whether the source water is fresh or saline, it is not clear on the face of the rule what level of "reduction" the Agency believes would comply. Moreover, EPA appears to have assumed that a wet recirculating cooling water system is a "cooling water intake structure technology" and decided (based on an erroneous picture of their engineering requirements and costs (see Appendix E) and without consideration of other relevant factors) that wet recirculating cooling is universally "available" and is the "best" technology for purposes of "minimizing adverse environmental impact." For these reasons EPA's proposal is flawed and should be reconsidered.

Footnotes

78 Although the proposed flow limit does not require minimization of make-up and blowdown and EPA says it is merely considering such a requirement, proposed § 125.86 (b)(5), 65 Fed. Reg. 49,120 col. 3, requires permittees to show that they have minimized make-up and blowdown. Thus, for purposes of these comments, we will assume EPA is proposing to require make-up and blowdown minimization.

79 While the rule refers to a “closed-cycle recirculating cooling water system,” the term included among EPA’s definitions is “closed-cycle recirculating cooling system.” Cf. proposed § 125.83 with proposed § 125.84(b)(2)(iii). We suggest that the Agency correct this inconsistency.

EPA Response

EPA has explained the legal basis for the final rule in the preamble to the final rule and these decisions are supported in the record as a whole. Specific responses to more specific comments made by the commenter are presented elsewhere in this comment response document. EPA's response regarding minimization of blowdown is contained in 316bNFR.068.102.

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Subject Matter Code 10.02

Authority to Limit Intake Flow

EPA's Proposal to Set Flow Limits Based on Closed-Cycle Cooling Is Not Authorized by the Clean Water Act

The comments in the sections below give some of the scientific and technical reasons why limitations on total flows and percentage withdrawals of cooling water are not an appropriate way of addressing entrainment and impingement in all cases. But there is a legal reason as well, namely that § 316(b) authorizes EPA to regulate only "intake structures."

For estuaries and tidal rivers, rivers, streams, and lakes within 50 meters of the littoral zone, and the littoral zone of oceans, EPA proposes to require intake flow to be reduced to a level commensurate with closed-cycle cooling. But even assuming, for the sake of argument, that a single technology should be chosen as BTA, that technology could not be closed-cycle cooling (or technology "commensurate" with closed-cycle cooling, as EPA puts it), because the plain language of § 316(b) limits BTA selection to intake structure technologies:

Any standard established pursuant to section [301] of this title or section [306] of this title and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

33 U.S.C. § 1326 (emphasis added).

EPA has consistently distinguished between the intake structure and other parts of the cooling system for purposes of § 316(b). The 1973 proposed § 316(b) rules defined "cooling water intake structure" as "the total structure used to direct water from a waterbody into the point source." 38 Fed. Reg. 34,410, 34,412 (Dec. 13, 1973). Similarly, the 1976 final rules defined "cooling water intake structure" as "the total structure used to direct water into the components of the cooling systems wherein the cooling function is designated to take place." 41 Fed. Reg. 17,387, 17,390 (Apr. 26, 1976). <FN 80>

Later EPA legal opinions confirm that § 316(b) addresses only intake structures. In Decision of the General Counsel No. 41<FN 81>, the General Counsel found that "[c]ooling towers or other closed cycle cooling systems are not cooling water intake structures. It is clear that there is no independent basis under § 316(b) to require a cooling tower in a permit." <FN 81> Yet this is exactly what EPA has done, by setting a performance limit that refers to and can only be met by modifying the cooling system as a whole (or by drastically reducing the capacity of the facility – a result Congress clearly did not give EPA authority to dictate (see Part III.D above).

It follows, therefore, that a cooling tower is not a "cooling water intake structure technology" that could be designated BTA or on which a BTA standard could be based. This does not mean that EPA cannot establish BTA requirements site-specifically (or otherwise, if justified) based on "technologies"

for the capacity of the CWIS. But it may not base performance standards or other requirements on technologies for other parts of the facility. Thus, extension of § 316(b) to parts of the facility other than the intake structure cannot be justified under EPA's interpretation of the statute.<FN 83>

EPA bases its opinion that it can regulate entire cooling systems on the word "capacity" in § 316(b). But UWAG submits that the "capacity" of an intake structure means the size of its opening and the amount of water that structure can hold at any given instant in time. EPA argues, to the contrary, that "capacity" means "volume," and volume means "volume of flow withdrawn," as though Congress had said "throughput capacity." Cf. Phillips Pipe Line Co. v. Diamond Shamrock Ref. & Mktg. Co., 50 F.3d 864, 866 n. 1 (10th Cir. 1995). Here is EPA's reasoning:

Section 316(b) authorizes EPA to impose limitations on the volume of the flow of water withdrawn through a cooling water intake structure as a means of addressing "capacity." In re Brunswick Steam Electric Plant, Decision of the General Counsel No. 41 (June 1, 1976). Such limitations on the volume of flow are consistent with the dictionary definition of "capacity," the legislative history of the Clean Water Act, and the 1976 regulations. Id. Indeed, as Decision of the General Counsel No. 41 points out, the major environmental impacts of cooling water intake structures are those affecting aquatic organisms living in the volumes of water withdrawn through the intake structure. Therefore, regulation of the volume of the flow of water withdrawn also advances the objectives of § 316(b).

65 Fed. Reg. 49,078 col. 2-3 (footnote omitted, emphasis added).

But by its terms, § 316(b) does not authorize regulation of the "volume of the flow of water withdrawn through a cooling water intake structure." Congress authorized regulation of the "capacity" of the CWIS, not the amount of flow through the CWIS, which is a function of facility and cooling system size and design, not the "volume" or size of the CWIS.

The important question is what Congress meant when it said "capacity." If Congress had meant to authorize EPA to regulate the capacity of the facility or of the cooling system, it would have said so. Instead it spoke of the capacity of "intake structures."

This is not to say that limiting flow is not an effective means of limiting entrainment. Indeed, UWAG believes that a facility designed to have low flows, as would be the case where recirculating cooling is used, typically can be presumed to cause little entrainment or impingement and, thus, to have avoided or "minimized" AEI. But UWAG does not agree that EPA has the authority to require that result. Rather, a permittee's proposal to use recirculating cooling should be an important factor that leads to the conclusion that AEI is unlikely to occur and, thus, that a proposed CWIS is BTA.

Footnotes

80 This is not to say that EPA's early definitions of "cooling water intake structure" were correct in every respect, only that EPA has always distinguished the CWIS from the rest of the facility.

81 Also, in Decision of the General Counsel No. 63, the General Counsel stated that a "cooling tower is not an 'intake structure' within the meaning of section 316(b)."

82 Decision of the General Counsel No. 41, In re Brunswick Steam Electric Plant (June 1, 1976), in 2 General Counsel Opinions, compiled by Environmental Law Publishing Service, 197, 203. The General Counsel goes on to say that "[t]he capacity of a cooling water intake could be restricted under 316(b) so as to necessitate the construction of a closed cycle

cooling system." Id. at 199 n. 5. As support for this proposition, he cites to legislative history that, far from showing Congress' intent as to § 316(b), instead focuses on § 511 of the Act, which governs the applicability of NEPA. Equally important, the General Counsel's opinion nowhere explains what CWIS technology might serve as the basis for such a limitation. EPA has never before taken the position that BTA requirements or limits may be set without reference to a specific CWIS technology for one of the Congressionally designated CWIS attributes (i.e., design, construction, location, capacity).

83 One participant at an EPA workshop erroneously suggested that permit conditions providing for cooling towers had been proposed for certain Hudson River facilities as "best technology available" under § 316(b). In 1974 and 1975, in reliance on EPA's then-current effluent guidelines for power plants, permit conditions pertaining to the thermal discharge from such facilities were proposed under § 316(a), not § 316(b). Following adjudicatory hearings that considered § 316(a) demonstrations for the facilities, such conditions were deleted from the permits that went into effect, as well as all subsequent renewals. The effluent guidelines relied upon for the permits as initially proposed were subsequently rescinded following an adverse judicial ruling in Appalachian Power Co. v. Train, 545 F.2d 1351 (4th Cir. 1976), and never reissued. See also Appalachian Power Co. v. Train, 566 F.2d 451 (4th Cir. 1977). This 20-year-old history therefore offers no support for the proposition that cooling towers should be declared BTA under § 316(b).

EPA Response

EPA disagrees with the comment and commenter's interpretation of General Counsel Opinion No. 41. See the preamble to the final rule and 316bNFR068.010. This rule establishes requirements based on the performance of certain technologies; it does not require the use of those technologies. This is exactly the same wat that the effluent limitations guidelines and standards program works under sections 301, 304, and 306 of the CWA.

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Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

Cooling Towers Can Have Side Effects, Which EPA Has Not Adequately Considered

Cooling towers, wet or dry, produce environmental side effects, some minor and some potentially serious. EPA did not consider these impacts before proposing § 316(b) requirements based on the performance of wet recirculating cooling towers. 65 Fed. Reg. 49,075 col. 2-3. EPA did, however, ask for comments on whether those effects should be considered and, if so, what they might be. Id. Following is a summary of the principal cross-media effects of wet recirculating towers. See also Argonne 1992.

Plumes. Natural draft or mechanical draft cooling towers can produce vapor plumes. Plumes create fogging and icing, which can create dangerous conditions for local roads and for air and water navigation. See Argonne 1992 at 14-15. Plumes may also be disfavored for reasons of aesthetics. Thus, whether plume effects are "adverse" will depend on the individual setting and its characteristics. The visible moisture plume from a natural draft cooling tower may be 20 to 30 percent longer than that from comparable mechanical draft cooling towers. GEIS, p. 4-28. Icing of vegetation and roads may occur near mechanical draft towers when fog is present and temperatures are below freezing. Id. (Wet/dry hybrid cooling towers, designed to abate vapor plumes, may not suffer from this problem, but may have others).

Displacement of Wetlands or Other Land and Habitats. A significant disadvantage of natural draft and mechanical draft cooling towers is the amount of space they require. When determining the area needed for natural draft and mechanical draft cooling towers, it is necessary to consider the possible plume effects, and, where possible, plan for the amount of space needed to minimize the effects of local fogging and icing and to minimize re-entrainment of the plume by the tower, which decreases cooling efficiency.

The space requirements for natural draft or mechanical draft cooling towers vary according to the production capacity of the facility. For an 1100 MW nuclear-fired facility, a natural draft cooling tower would require between 3-6 acres, while mechanical draft cooling towers for a 300 MW facility would require 0.75 acres. See Stone & Webster 1992.<FN 84>

Increased Energy Use/Lost Capacity. For both natural draft and mechanical draft towers, increased energy use and lost capacity are due to increased auxiliary power requirements (e.g., power used to run the cooling tower fans) and higher turbine backpressure (i.e., the pressure of the exhaust steam from the last stage of the turbine).<FN 85> For a closed-cycle cooling tower system, the water temperature is higher and the water flow rate is lower than for a once-through system. Stone & Webster 1992, p. 34. Closed-cycle systems also have higher pumping heads (requiring more power than once-through systems) and, in the case of mechanical draft towers, fan power requirements. Id.

The ultimate loss of power depends on turbine design, which will vary across units. Stone & Webster

(1992) examined the lost capacity and resulting replacement power costs for retrofitting two hypothetical plants, a 300 MW fossil fuel-fired station and an 1100 MW nuclear station, with cooling towers. For the fossil plant, the case study estimated a loss of 44.3 kilowatts per MW, and for the nuclear plant, 54.6 kilowatts power MW. Id. Table IV. Assuming that all plants with existing §316(a) variances had to retrofit cooling towers by December 2000, Stone & Webster estimated total national replacement power costs (in year 2000 dollars) of $32,100,000,000. Id. Table VI. While retrofitting cooling towers is normally more expensive than constructing cooling towers at a new facility, nonetheless the Stone & Webster report indicates the magnitude of replacement power costs due to use of natural or mechanical draft cooling towers.

Increased Air Emissions. Since closed-cycle cooling systems exact an "energy penalty," plants using these systems (as opposed to open-cycle cooling) must use more fuel to create the same amount of electricity. See Argonne 1992 at 6. For fossil-fuel plants, that translates into increased atmospheric emissions of sulfur dioxide, nitrogen oxide, and carbon dioxide. Among the closed-cycle technologies, the use of dry towers causes significantly greater reductions in generation and thus greater air emission impacts for the generation of replacement power. Id. 13.

Salt Drift. The operation of natural draft or mechanical draft cooling towers using either brackish water or salt water releases water droplets containing concentrations of soluble salts, including sodium, calcium, chloride, and sulfate ions. GEIS, p. 4-35. Additionally, salt drift may be a problem for facilities or fresh water systems that operate recirculating cooling water systems at high cycles of concentration. Salt drift from such towers may be carried by prevailing winds and settle onto soil, vegetation, and waterbodies. The cooling tower system design and the salt content of the source water are the primary factors affecting the amount of salt emitted as drift.

Salt drift may cause damage to crops through two processes, deposition directly on the plants, or accumulation of salts in the soil. GEIS 1996, p. 4-36. It may also cause localized effects to natural resources. GEIS 1996, p. 4-45.

Noise. Noise from natural draft or mechanical draft cooling towers is generated by falling water inside the towers plus fan or motor noise or both. See Argonne 1992 at 15. Natural draft and mechanical draft cooling towers can produce a typical sound level of 70-75 dB(A) at a distance of 100 feet from the towers (Elliott 1985). Whether noise is a problem at any specific site depends on surrounding land uses.

Increased Solid Wastes (Sludge). For natural draft and mechanical draft cooling towers, recirculating cooling water increases solid wastes generated because some facilities treat the cooling tower blowdown in a wastewater treatment system, and the concentrated pollutants removed from the blowdown add to the amount of wastewater sludge generated by the facility.

Evaporative Consumption of Water. Natural draft and mechanical draft cooling towers normally result in significant evaporation or loss of water drawn from the source water. In its Cost Research Report, EPA estimates that loss at between 0.5% and 1%. UWAG's technical experts believe the actual figure is 1 to 1.5% or higher in most cases, whether the facility is new or existing. In any case, the amount of evaporation losses from cooling towers will be substantial. See Argonne 1992 at 13-14.

This level of evaporative loss does not occur in once-through systems, since a high percentage of the cooling water is returned to the source waterbody. Depending on the size and flow conditions of the affected waterbody, evaporative water loss can affect the quality of aquatic habitat and recreational fishing.

Increased Mortality of Entrained Organisms. As already noted, organism sensitivity to entrainment varies among species and among life stages and/or size within species. Entrainment survival at any particular cooling water intake structure therefore depends in large part on the physical tolerance and thermal tolerance of the involved species and life stages subject to entrainment exposures.

Cooling water intake structure design and operating conditions affect the physical stresses present during entrainment. As noted in Part VII.E, cooling towers cause essentially 100 percent mortality of entrained organisms due to the magnitude of system stresses and the fact that cooling water recirculates in these systems.

In spite of the considerations described above, cooling towers can be an appropriate way of minimizing water withdrawal while removing waste heat. Compared with dry cooling, for instance, their effects in terms of energy penalties, air emissions, noise, and land use are far smaller and consequently more acceptable, in many cases. Whether or not they make sense in a specific case depends heavily on the nature of the proposed project and its site.

Even if EPA had authority to require changes to a cooling system, rather than just to a CWIS, cooling towers should not be required without consideration of their social and environmental impacts, such as those described above.

Footnotes

84 A dry cooling system would occupy 2-3 times more land than a mechanical draft cooling tower for a comparable facility.

85 Although wet recirculating systems impose substantial energy penalties when compared to once-through systems, their overall penalties are considerably lower than for dry towers. See Appendix F.

EPA Response

EPA disagrees that the non-aquatic impacts of recirculating cooling towers listed by the commenter were not considered for proposal. While EPA acknowledges that it did not present quantified information regarding the subjects in the comment, EPA points out that it discussed the "side effects" of both wet and dry cooling towers in the proposal. Specifically, EPA discussed discharge water quality, salt drift, water conditioning chemicals and biocides, vapor plumes, energy efficiency, land use, and air emissions increases (65 FR 49080-49081). As pointed out by the commenter, EPA invited comments to the proposal on the subject of adverse environmental impact and whether or not it should consider nonaquatic impacts such as salt/mineral drift and reductions in the efficiency of electricity generation leading to increased air emissions as examples of adverse environmental impact (65 FR 49075). In turn, EPA received no data from commenters supporting assertions that these "side effects" pose significant environmental problems. In fact, EPA received only anecdotal information on the subjects such as in this comment. EPA researched the subjects further after proposal and provided some of the information in the notice of data availability and has cited other information in response to comments on the subjects.

EPA presented information in the notice of data availability concerning quantifiable nonaquatic impacts of wet and dry cooling towers. EPA presented information and methodologies for projecting energy penalty impacts at facilities installing wet and dry cooling towers as a result of this rule or evaluated options (66 FR 28866) and for associated increases in air emissions (66 FR 28867).

EPA notes that the vast majority (90 percent) of power plants projected within the scope of this rule would install recirculating wet cooling towers in absence of this rule. Of these 74 power plants, EPA projects that the cooling towers to be constructed will be of the mechanical draft type. (See Stone & Webster 1992). For the other nine power plants for which EPA has projected the compliance costs associated with wet cooling towers, it is projected that the towers to be installed would be of the mechanical draft type, also. As noted by the commenter, these towers generally produce smaller plumes than the natural draft towers. A rare "treatment" technique for these plumes is the installation of plume abatement on the tower. This is currently practiced at very small portion of recently constructed facilities (See DCN #2-037). As such, EPA's cost estimates do not include plume abatement costs, as they are not necessary nor applicable for this national rule.

In response to comment about wetlands or other land and habitat, EPA notes that existing 404 programs protect wetlands and habitats. Also see Chapter 3 of the TDD.

In the development of the final rule, EPA considered the land area required for installation of cooling towers at new power plants. EPA analyzed the cost to new power plants of purchasing additional land for (1) installing mechanical draft cooling towers in lieu of once-through cooling (for those power plants expected to incur the costs of cooling towers only) and (2) providing land area buffers for plumes at a portion of facilities. EPA determined the final annualized costs were not sensitive to the described changes in land costs. EPA also understands that the costs of these land acquisitions as a portion of total project costs for new power plants are negligible. In addition, because this rule applies to new facilities which have the ability, in the majority of cases, to alter the design and location of their facilities without encountering most of the hurdles associated with retrofitting existing facilities, the issue of additional land acquisition is not as significant.

Regarding aesthetics of cooling tower plumes, EPA points to the Track II compliance option as an alternative for new facility power plants. In addition, plume abatement controls, which are currently installed at approximately two percent of new facility power plants, are an option for new plants that choose to site where plume aesthetics are a public nuisance. EPA notes that land area buffers may also be a simple means for reducing the effects of visible plumes, though this would be highly site-specific. As such, EPA has considered the subject of visible plumes to be a small issue when weighed against the serious aquatic environmental impacts of once-through cooling as discussed in response to comment 316bNFR.501.015 and section III of the preamble to today's rule.

EPA considers the issue of plume "re-entrainment" to be an issue that has been well addressed by designers and operators of wet cooling towers. The technology is mature and well designed after many decades of use throughout the world in a variety of climates. EPA considers plume re-entrainment at the nine power plants projected to upgrade their cooling system to be a small effect. For wet cooling towers, the plume re-entrainment value occasionally referenced is 2 percent (Burns & Michelletti 2000). This value, in EPA's estimates would not appreciably impact cooling tower performance, nor have a discernable environmental impact.

EPA has examined the energy losses due to cooling towers in a detailed study for this rule. Chapter 3 of the Technical Development Document presents the results of EPA's energy penalty analyses. The energy penalty value for wet cooling towers at fossil fuel-fired stations presented by the commenter is overstated for new construction (the commenter presents an energy penalty of 4.4 percent). EPA determined through its detailed study that the mean annual energy penalty of a coal-fired plant utilizing a wet cooling tower in lieu of once-through cooling would be 1.65 percent. The effects of this energy penalty on the four coal-fired power plants projected to install cooling towers as a result of this rule is included in the final national cost estimates, which are economically practicable for all impacted facilities.

As discussed in response to comment 316bNFR.039.038, the inclusion of retrofit costs in a comparison for this new facility rule is inappropriate.

EPA has analyzed the increased air emissions expected as a result of the final rule and for the hypothetical dry cooling option that was considered and rejected, in part due to the expected air emissions increases. See Chapter 3 of the Technical Development Document for discussion of EPA's analysis. EPA's conclusion is that the expected air emissions increases due to this rule are small.

In the cases where it is necessary, salt drift effects (if any) are mitigated by very similar means as those used to minimize migrating vapor plumes (i.e., through acquisition of buffer land area surrounding the tower). Additionally, modern cooling towers are designed as to minimize drift through the use of drift elimination technologies. The Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437 Vol. 1, Nuclear Regulatory Commission) states the following concerning salt/mineral drift from cooling towers: "generally, drift from cooling towers using fresh water has low salt concentrations and, in the case of mechanical draft towers, falls mostly within the immediate vicinity of the towers, representing little hazard to vegetation off-site. Typical amounts of salt or total dissolved solids in freshwater environments are around 1000 ppm (ANL/ES-53)." EPA projects that four of the nine power plants which will upgrade their cooling system from once-through to recirculating closed-cycle will utilize freshwater sources. EPA anticipates that the other five plants (each a combined-cycle design) will utilize estuarine/tidal water sources for cooling and that the issue of salt drift is of small significance and can be mitigated. This conclusion is supported by those reached by the NRC salt-drift upon extensive study at existing nuclear plants: "monitoring results from the sample of [eighteen] nuclear plants and from the coal-fired Chalk Point plant, in conjunction with the literature review and information provided by the natural resource agencies and agricultural agencies in all states with nuclear power plants, have revealed no instances where cooling tower operation has resulted in measurable productivity losses in agricultural crops or measurable damage to ornamental vegetation. Because ongoing operational conditions of cooling towers would remain unchanged, it is expected that there would continue to be no measurable impacts on crops or ornamental vegetation as a result of license renewal. The impact of cooling towers on agricultural crops and ornamental vegetation will therefore be of small significance. Because there is no measurable impact, there is no need to consider mitigation. Cumulative impacts on crops and ornamental vegetation are not a consideration because deposition from cooling tower drift is a localized phenomenon and because of the distance between nuclear power plant sites and other facilities that may have large cooling towers." (NUREG-1437 Vol. 1)

Noise abatement features are an integral component of modern cooling tower designs, and as such are reflected in the capital costs of this rule, which were empirically verified against real-life, turn-key costs of recently installed cooling towers. Generally, power plant sites do not result in off-site levels more than 10 dB(A) above background (NUREG-1437 Vol. 1). Therefore, this issue is primarily in terms of adverse public reactions to the noise and not environmental or human health (i.e., hearing) impacts. The NRC adds further, "Natural-draft and mechanical-draft cooling towers emit noise of a broadband nature...Because of the broadband character of the cooling towers, the noise associated with them is largely indistinguishable and less obtrusive than transformer noise or loudspeaker noise."

EPA has accounted for solid waste disposal from cooling tower blow-down wastewater treatment in the operation and maintenance costs of this rule. EPA reiterates that only nine power plants are projected to install cooling towers with associated wastewater treatment.

EPA has considered evaporation of water at the facilities that would not have installed wet cooling towers, but the requirements of this rule and finds these issues not to be significant. EPA notes that once-through cooling consumes water, in and of itself. According to the NRC (NUREG-1437 Vol. 1), "water lost by evaporation from the heated discharge [of once-through cooling] is about 60 percent of that which is lost through cooling towers." NRC goes on to further state, "with once-through cooling systems, evaporative losses are about 40 percent less but occur externally in the adjacent body of water instead of in the closed-cycle system." Contrary to the statement made by the commenter, evaporation does occur due to heating of water in once-through cooling systems, even though the majority of this loss happens down-stream of the plant in the receiving water body. Nevertheless, this evaporation, as noted by NRC, is directly result of the influence of the once-through system.

Moreover, when considering the consumptive use of water in cooling towers, EPA notes, again, that 90 percent of the in-scope power plants will install cooling towers regardless of the requirements of this rule. The nine other facilities, which may comply with the rule either through installation of flow reduction technologies similar to cooling towers (such as recirculating cooling lakes, cooling canals, or hybrid wet-dry cooling towers) or installation of a technology such as dry cooling, are expected to consume approximately 127,000 gallons per minute (evaporative loss) when all new plants are operating. This represents less than three (3) percent of the baseline intake flow of the power plants within the scope of the rule. As a percentage of the total flow of water used for electricity generation in the US, this represents 0.1 percent.

EPA does not challenge the assertion made by the commenter that entrainment mortality in cooling towers is nearly 100 percent. However, as noted by the commenter, the cooling intake flow at a power plant equipped with a cooling tower is approximately 95 percent less than for a once-through system. Once-through systems can see significant (and in some cases, enormous) rates of mortality for entrained organisms (see response to comment 316bNFR.501.015). Therefore, on a national level, the mortality of entrained organisms at once-through plants is significantly higher than at comparably sized recirculating closed-cycle systems.

Because EPA has the authority to regulate capacity of cooling water intakes, has considered the full range of environmental impacts from cooling towers (as noted above), and has considered the full economic impacts of their installation at the nine power plants and 29 manufacturers expected to incur costs as a result of this rule, EPA has based some requirements of the final rule on closed-cycle

recirculating cooling systems.

Finally, EPA notes that the commenter represents the Utility Water Act Group, and as such, EPA framed this comment response around cooling tower installations at power plants. However, EPA expects that 29 manufacturers will incur costs equivalent to installations of closed-cycle wet cooling towers as a result of this rule. Even though these costs reflect cooling tower installations, EPA projects that manufacturing facilities will comply, in the majority of cases, with this rule through the adoption of recycling and reuse design changes and operational practices at their plants. Therefore, the majority of issues discussed in this comment are not of concern to manufacturing facilities for the final rule.

Comment ID 316bNFR.068.101

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Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

The Intake Flow Limit Requires Clarification

Even if an intake flow limit were warranted for CWISs in certain locations, EPA's proposed limit requires the permit applicant for a new facility to show that it has reduced flow to "a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system" but does not say what that level is. See, e.g., proposed § 125.84(b)(2)(iii), 65 Fed. Reg. 49,117. Only in the preamble does EPA discuss what range of reduction this might entail. 65 Fed. Reg. 49,087. EPA does not, however, systematically analyze what factors might affect the range of reduction achievable or provide any empirical data.

The only information on this point in the record appears to be two sequential versions of a two-page memo prepared by a consultant, containing a chart projecting flow reductions for what appear to be hypothetical plants under assumed conditions. See Kaplan 2000b (DCN:1-1073-TC); Kaplan 2000a (DCN:1-1076-TC).<FN 86> This simply is not adequate support for a rule of this importance, nor does it give enough specific information for permit applicants and permit writers to know what is intended. While UWAG agrees that the level of flow achievable by recirculating systems will vary based on site-specific design and ambient conditions, we do not believe it is appropriate for EPA to require reductions commensurate with such systems without explaining clearly how compliance will be determined.

Footnotes

86 Mr. Kaplan's memoranda suggest that wet closed-cycle cooling can reduce flow by 95?98% in freshwaters and 70-90% in brackish or saline waters. EPA says in the preamble that the expected reduction is 96-98% freshwater and 70-96% in saltwater. 65 Fed. Reg. 49,087 col. 1. EPA does not explain where its figures come from.

EPA Response

Contrary to the commenter's assertion, EPA systematically analyzed the factors that affect the range of flow reductions achievable with closed-cycle recirculating cooling. As pointed out by the commenter, EPA provided a detailed analysis in the record of the proposal detailing a variety of conditions for flow reduction through closed-cycle cooling. See Kaplan 2000b (DCN:1-1073-TC); Kaplan 2000a (DCN:1-1076-TC). EPA disagrees with the commenter as to the usefulness of this information and points out that the commenter simply states that it is insufficient, but does not challenge the data contained in the reference.

EPA agrees that the memo in the record, in and of itself, is not sufficient information for the basis of the final rule. EPA notes that it received only one piece of information on the subject during two separate and lengthy comment periods. The commenter provided supplementary information, prepared by a consultant, that EPA has incorporated into its analysis for flow reduction levels. In addition, EPA analyzed the extensive data base collected for the existing source rule, the detailed technical questionnaire, for verification of the final flow reduction analysis. As such, EPA's final flow

reduction requirements are based on empirically verified data for a wide range of conditions.

EPA also has clarified the levels of reduction expected for compliance with the flow reduction requirements of Track I in the preamble to the final rule, in Chapter 2 of the Final Technical Development Document, and through the Compliance Guide.

Comment ID 316bNFR.068.102

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Subject Matter Code 12.0

Best Technology Available-Flow and Volume

A Requirement to Minimize Make-up and Blowdown Would Be Subjective and Unwarranted

Although EPA says that use of wet cooling systems will reduce intake flow, EPA also recognizes that make-up water will be needed, due to loss of water through evaporation, windage, drift, and blowdown. 65 Fed. Reg. 49,087 col. 2. EPA proposes to add to its flow limit a further requirement that the permit applicant show that its recirculating system design minimizes make-up and blowdown. Id.; see also 65 Fed. Reg. 49,120 col. 3.

UWAG opposes any such additional requirement. A regulation requiring that make-up and blowdown be “minimized” is too subjective. There is nothing in the preamble that explains exactly what “minimize” means or how a permittee will demonstrate, and a permit writer will determine, that make-up and blowdown have been minimized.

This is important, because the amount of make-up water is directly connected to the level of blowdown. Cheremisinoff and Cheremisinoff 1981, p. 7. The extent of blowdown in turn affects water chemistry and the facility’s ability to control corrosion and scaling. The dissolved mineral material in most natural waters consists mainly of calcium in the form of bicarbonate or temporary hardness and chlorides and sulfates as permanent hardness. The tendency of the water to deposit scale when made alkaline by heating, or to attack metals corrosively, depends on the balance of these various constituents. The purpose of blowdown is to prevent an increase in the concentration of these solids due to evaporation. Cheremisinoff and Cheremisinoff 1981, pp. 5, 188.

The extent of blowdown required depends on the water quality needed to maintain the circulating water system within appropriate design criteria for corrosion and scaling. Id. Exceeding design levels may result in serious operating problems. The presence of suspended and dissolved matter can lead to precipitation under the proper conditions, causing severe scaling or fouling problems in process equipment and distribution systems. Cheremisinoff and Cheremisinoff 1981, p. 185.

In short, absent some better explanation of what EPA intends and what criteria will be applied, a make-up and blowdown minimization requirement would be unduly vague. Nor is there any evidence that it is necessary. Without more details, UWAG is unable to comment on its technical feasibility or cost.

EPA Response

EPA believes minimization of makeup and blowdown is part of efficient facility operation (where wet cooling towers are employed) and therefore desirable for any facility, regardless of standards finalized in today's rule. EPA agrees a certain amount of makeup water is necessary to reduce corrosion effects and scaling. In addition, EPA agrees the term "minimize" cannot not be universally defined in

this instance because of the differences in water quality, facility needs, etc. Therefore, EPA relies on the best professional judgment of the facility and the permitting authority to determine an acceptable goal for minimizing makeup and blowdown flows.

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Subject Matter Code 12.0

Best Technology Available-Flow and Volume

EPA's Proposed Proportional Flow Withdrawal Limits Lack a Legal and Technical Foundation

As to its proposed proportional flow withdrawal limits, which apply to new facilities on freshwater rivers and streams and estuaries and tidal rivers,<FN 87> EPA identifies no cooling water intake structure technology per se that is capable of achieving those limits. See 65 Fed. Reg. 49,085-86. Rather, EPA appears to have based the limits solely on its view of what level of withdrawal, in combination with the velocity limit described above in Part VII.G, "protect greater than 99% of the aquatic community from impingement and entrainment." See, e.g., 65 Fed. Reg. 49,086 col. 2. EPA says that new facilities will meet these limits either by finding sites on waterbodies with sufficient flow or volume to ensure that, even under worst-case instream conditions, the percentage withdrawal limit can be met, or finding alternatives to use of surface water.<FN 88> 65 Fed. Reg. 49,085-87.

As support for its assertion that the proposed standards for freshwater rivers and streams are achievable, EPA says that it conducted an analysis to determine how many river miles could support power plants or manufacturing facilities with specified withdrawal requirements. 65 Fed. Reg. 49,085-86. The Agency concludes that somewhere between 18,000-47,000 river miles would be available for levels of withdrawal of 85-700 MGD. Id. Moreover, it concludes that 89% of existing non-nuclear plants would be able to achieve the proposed standards for fresh water. Id. at 49,086 col. 1. Based on the limited information available in the record, it is not clear how EPA performed this analysis. EPA provides no cite to any record support, and the items in the docket that might conceivably relate to this issue provide scant details. See Tetra Tech 2000a (DCN:1-1052-TC); EPA 2000c (DCN:1-1069-TC); EPA 2000d (DCN:1-1055-TC); Tetra Tech 2000b (DCN:1-1044-TC.) Thus, we are unable to comment on the accuracy of that analysis.

Also, the 89% of existing non-nuclear plants that EPA says could continue to operate at their existing sites could do so only if they operated with recirculating cooling. Id. But all or even most of these facilities have closed-cycle cooling. So EPA's analysis fails to address the key question of whether proposed new facilities that are more like existing facilities, rather than the smaller, combined-cycle facilities that are the focus of EPA's analysis here, would be precluded. And EPA's analysis itself shows that 11% of existing facilities, and by implication all nuclear facilities, could not operate at their existing sites, even with closed-cycle cooling.

Even if EPA's analysis is correct, however, the high end of its range of available river miles constitutes only 1.34% of the 3.5 million river miles in this country. See http://www.nps.gov.rivers/quotes.html. The lower end of its range is only one-half of one percent of the total river miles. This means that its requirement effectively "zones out" between 98.36 and 99.49% of all waters for use by "large" power plants. Obviously, EPA's analysis is incomplete, because it does not analyze the impact on siting of plants requiring larger withdrawals (and some existing baseload power plants, including nuclear plants, withdraw more water than EPA has assessed) and does not address how many river miles could accommodate smaller plants.

Equally important, EPA's analysis does not consider whether any of the river miles it identifies as available are sufficiently close to transmission and distribution corridors, allow for economically practicable access to fuel sources, are in regions or areas where cumulative impacts to air or water might raise concerns, are near markets where power is most needed, or otherwise are truly "available" for siting. These omissions make EPA's analysis useless for all practical purposes. And for estuaries EPA apparently did no analysis at all. Thus, it had no way of knowing to what extent its 1% proportional withdrawal limit for estuaries would preclude power siting along the coasts – areas where recent reports suggest new power production is desperately needed.

Footnotes

87 EPA has not proposed a proportional flow limit for lakes or reservoirs. UWAG agrees that any such limit would not be appropriate, for the reasons EPA gives, and because, as described in other sections of these comments, any such limits are of dubious biological relevance.

88 EPA might also have assumed that facilities would reduce flow to achieve this limit by using closed-cycle cooling even in situations where it was not otherwise required. But EPA neither articulates this assumption nor attempts to assess its costs.

EPA Response

The technologies that a facility may use to meet the proportional flow limits include locating in an appropriate location, or obtaining water from groundwater, greywater, or municipal sources.

For riverine facilities, EPA estimated the number of available river miles available to support average facilities within the utility, nonutility and manufacturing sectors. For each sector, an average design intake flow was derived from facilities in the 67th percentile and higher and weighed against data collected from EPA's BASINS program. Segments deemed "available" are able to support the representative facility. That is, siting a facility of a particular size at that location would not withdraw more than 5% of the mean annual flow of a particular waterbody.

BASINS characterizes river segments on a scale of zero to six, with zero representing the largest segments. A "zero" segment typically discharges to the open ocean or large estuary. A representative "zero" segment would be the Mississippi Sound. A "one" segment discharges to a "zero" segment, and so on. The main stem of the Mississippi is a "one" segment.

EPA has determined the distribution of available river miles will not adversely affect regional electrical power needs. While EPA conducted its original analysis of river mile availability based on the size of existing facilities, this does not necessarily characterize the design and configuration of future generating stations. Recent trends in the electric generating industry have incorporated more advanced technologies, including combined-cycle turbines and recirculating cooling systems, which are more energy efficient and require less cooling water.

EPA estimated the average generating capacity for planned facilities to be approximately 750 MW using the NewGEN database. Data from EPA's survey questionnaire indicates the average design intake capacity for 750 MW facilities sited on a freshwater stream or river to be approximately 400 MGD. If the predicted trends are accurate, a significant number of additional river miles would be available for use.

Information regarding the historical mean annual flow for most freshwater rivers and streams can be obtained from the US Geological Survey's website at: water.usgs.gov/nwis/sw.

EPA recently conducted an analysis of existing estuarine facilities that compared design intake flows with the 1% standard in today's final rule. For more information on this analysis, please see "1% Tidal River/Estuary Intake Flow Analysis" dated 11/7/2001 in the Docket.

Comment ID 316bNFR.068.104

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Subject Matter Code 10.02

Authority to Limit Intake Flow

While EPA does not discuss any legal basis for this standard, it appears to assume that the statutory references to the location and capacity of the intake structure give it carte blanche to impose this sort of limit, effectively placing certain sites "off limits" for larger facilities that need cooling water. But as discussed above in Part III.D, § 316(b) clearly instructs that capacity may be controlled only by "technology" related to the "cooling water intake structure" – not the entire cooling system or other attributes of the facility as a whole.

The same is true of location. In other words, Congress gave EPA authority to establish requirements to ensure that the capacity of the CWIS itself – not the whole cooling system – and the location of the CWIS – not the whole plant – reflect BTA for a plant of the design and capacity specified by the permit applicant. It did not give EPA the authority to dictate power plant siting and design overall.

Had Congress intended to give EPA such broad authority, it surely would have said so, given the implications for energy supply, reliability, and cost, and the broader economic implications those issues raise. And it would be incredible to suggest that Congress would have given EPA such broad powers to affect power plants without any consideration of the energy implications of such restrictions. Yet EPA has done no meaningful analysis of the national, regional, or local energy ramifications of its approach. EPA must do such an analysis, and satisfy itself and the public that there will be no serious adverse social ramifications of its standards, before deciding whether to proceed with its proposal.

EPA Response

EPA disagrees. See 316bNFR068.010. EPA further believes that it does not have "carte blanche" as commenter suggests, but that it should be guided by the factors relevant to a best available technology determination under section 304 of the CWA or best available demonstrated control technology under section 306 of the CWA. Thus, in this final rule, EPA has considered technical availability (including that many new facilities would meet these requirements independently of the rule); economic practicality or affordability as determined by a cost to revenue ratio; non-water quality environmental impacts (including air emissions, energy impacts and other impacts). In addition to interpreting the word capacity to include dynamic flow, an interpretation that is longstanding and which has not been amended in subsequent amendments to the CWA, the commenter's argument is analogous to arguing that EPA may not consider process changes and the engineering aspects of the application of various types of control techniques in setting effluent limitations because such operations are not at the end of pipe. Just as EPA may consider process changes that would make a difference in effluent discharges, EPA may consider technologies that result reduced capacity of the cooling water intake structure. This serves the purpose of section 316(b), to minimize adverse environmental impacts of cooling water intake structures.

Comment ID 316bNFR.068.105

Subject Matter Code	12.21
	Thermal Stratification

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EPA's Proposed Prohibition against Altering the Natural Thermal Stratification of Lakes and Reservoirs Is Legally and Technically Flawed

Rather than imposing any limit on the percentage of water that a new facility could withdraw from a lake or reservoir (which UWAG agrees would be inappropriate), EPA proposes to prohibit any alteration of the natural stratification of such waterbodies (proposed § 125.84(c)(1), 65 Fed. Reg. 49,118) and to require each permittee to demonstrate that its CWIS will meet this requirement (proposed § 125.86(b)(3)(iii), 65 Fed. Reg. 49,120).

Nowhere does EPA provide any indication of what CWIS technology might be applied to meet this standard, assuming, as EPA has, that such alteration is of biological significance (see Part IX.B.3 above). Rather, EPA simply states that it "believes that placing CWIS in these deeper [profundal] areas represents the least potential for biological impacts in these systems." EEA, p. 11-8. The implication is that intake location, and not a specific technology, is adequate to meet compliance requirements.<FN 89> Thus, EPA is restricting siting of CWISs in lakes and reservoirs without even considering possible technological solutions.

Also, EPA nowhere defines what "alter" means. In a lake or reservoir, stratification results from natural physical processes that result in a layer of warmer surface water separated from a cooler (and therefore more dense) layer by a thin boundary called the thermocline. In nature, many factors influence the formation and dissolution of the stratified waterbody (e.g., seasonal temperature changes and wind). When a power plant is located on the waterbody, additional factors are introduced that affect the relative heat balance of the system. The degree to which a cooling water withdrawal and corresponding thermal effluent discharge contribute to "altering" the stratification is largely a function of the volume of water withdrawn, the zone from which it is withdrawn, the delta T across the condenser, and the location and depth of the discharge.

However, any power plant intake and discharge located on a lake or reservoir will "alter" the stratification in some way. The real issue is the degree of the alteration, which will vary based on site-specific differences in these factors. As discussed elsewhere in these comments, minimizing unacceptable alterations requires careful balancing of factors relating to the waterbody, the intake structure, and the discharge. Section 316(b) gives EPA authority over only the CWIS, not over discharges or other factors. Thus, a limit of this type, which not only may be impossible to meet but also implicates an aspect of the facility regulated under other sections of the Clean Water Act, is inappropriate and, for the reasons discussed above, wholly unnecessary.

Footnotes

89 EPA goes so far as to say "Therefore, EPA's proposed regulation places no national § 316(b) compliance requirements on CWIS located in the profundal zones of lakes and reservoirs." Id. It is not clear why EPA thinks this is so, given that the "no alteration" standard is very stringent indeed and applies to all new lakes and reservoirs.

EPA Response

EPA believes the natural thermal stratification of a lake, if present, influence the physical and chemical cycles of lakes, which, in turn, strongly govern their production, utilization, and decomposition. A facility with a disproportion ally large water intake can adversely impact both primary and secondary production. EPA believes the intake capacity standard for lakes and reservoirs is economically practicable and technologically achievable for new facilities, and will result in an acceptable level of source water protection.

While no percentage restriction is included for lakes and reservoirs in today's final rule, new facilities located on a lake or reservoir are required to establish a maximum intake capacity that will not disrupt the natural thermal stratification or turnover pattern of the source waterbody where such stratification or turnover pattern is determined to be beneficial. EPA believes an "across-the-board" limit is unworkable for lakes and reservoirs since the concept of flow is inapplicable to a lake. In addition, EPA believes preserving some degree of the natural thermal stratification, if present, is desirable because of the increased cooling efficiency that can result. The thermal stratification standard, while different from the flow-based standards for estuaries and freshwater rivers, does limit a new facility to an intake capacity that will achieve an acceptable level of protection for the source water.

EPA believes the two track approach presented in today's final rule affords cooling water users adequate flexibility in meeting the standards. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

EPA expects new facilities located on a lake or reservoir to work in conjunction with the permitting authority to correctly determine what constitutes an unacceptable disruption of any natural thermal stratification or turnover pattern.

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Subject Matter Code 13.1

Requirement of 0.5 fps

EPA's Proposed Velocity Standard Lacks Adequate Technical Support

With respect to velocity, EPA appears first to have decided that a design "through screen" velocity of 0.5 fps is necessary to minimize AEI, then to have set out to look for technologies that could achieve that standard. 65 Fed. Reg. 49,087. EPA suggests that "velocity is easily addressed during the design and construction phase of a cooling water intake structure." 65 Fed. Reg. 49,078. EPA does not, however, explain why that is the case or how its proposed velocity standard may be "easily addressed."

In fact, velocity is a function of both the amount of water being withdrawn per unit time and the size of the open area of the inlet through which it is passing. This relationship is expressed by the formula: Q = A * V, where Q = flow rate (e.g., gallons per minute), V = velocity (e.g., fps), and A = area (i.e., open area through which the flow is passing). To reduce the velocity to achieve a specified standard at a power plant of a given size (e.g., from 1.0 to 0.5 fps), one must either increase the size of the opening (in this example, by doubling the size) or decrease the amount of flow (in this case by 50%). Reducing plant flow in turn affects the temperature rise, or "delta T," across the condenser, which reduces power output. Thus, any temperature limits at the point of discharge also must be considered. EPA does not explain or consider any of these factors. Neither does it examine the incremental increase in costs its velocity requirement may impose over other, higher velocities or other technologies that are also effective in reducing impingement where that is necessary. <FN 90>

Perhaps acknowledging that achieving a velocity of 0.5 fps might not be so easy after all, EPA suggests that facilities whose original design cannot meet the proposed velocity standard may do so by (1) branching the intake into a greater number of openings/pipes using a "Tee" or installing some type of generic-brand "enlarger,"<FN 91> (2) installing velocity caps on branched intakes, or (3) constructing a passive intake screen system on branched intakes. EEA, pp. 6-5 to 6-7, and App. A, pp. 26-30; SAIC, Cost Research and Analysis of Cooling Water Technologies for 316(b) Regulatory Options (July 2000) (Cost Research Report), Docket No. 1-4045-EA, pp. 32-37. At least, this is what UWAG, after much study, believes EPA is proposing. EPA's description of the options, their design, and the basis for estimation of their costs is opaque and confusing at best, even to experts with many years of experience in this field.

Footnotes

90 EPA has asked for comment on several alternative velocities. 65 Fed. Reg. 49,088 col. 3. UWAG believes that selecting the right velocity, without over-regulating, is highly site-specific and requires consideration of factors like those identified in UWAG's Narrative Factors Report (Appendix C to these comments).

91 The EEA, which contains very little engineering and focuses on general cost estimates, makes it clear that EPA is assuming, based on "best professional judgment," that power plants and manufacturers alike can and will use off-the-shelf components, rather than larger diameter, custom-made pipes that are far more expensive. EEA, App. A, p. 29. In fact, for the reasons discussed below, power plants would be very unlikely to use the off-the-shelf fittings EPA has assumed.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

The branched intake designs in the proposed rule are representative of one possible technical solution to reducing intake velocity. As this rule addresses new facilities (i.e. facilities that do not yet exist), very little data was available to craft a comprehensive technical solution for every imaginable intake design. EPA therefore used this theoretical example as the basis for costing technical solutions.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

Finally, it is worth noting that new facilities can be designed with consideration given to the through-screen velocity requirement, and designs can be altered accordingly. Today's rule does not apply to existing facilities, as EPA will address existing facilities fully in Phase II and Phase III rulemakings.

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Subject Matter Code 13.1

Requirement of 0.5 fps

EPA is not clear on a threshold question: for which velocity did it design? EPA says that its engineering assessments assumed a "flow velocity" of 0.5 fps (EEA, p. 6-6), but it does not say whether that "flow velocity" is through-device or approach velocity, making it difficult to assess the legitimacy of its conclusions. If EPA did not evaluate these technologies in light of the through-screen or through-device velocity, the engineering and cost implications would be significant. As EPA notes, the through-device velocity will always be higher than the approach velocity. 65 Fed. Reg. 49,088 col. 1. For example, in many cases it is reasonable to assume that the open area of a screen will be only 50% of the total area of the device. Thus, the through-device velocity would be twice as high as the approach velocity. So to reduce the through-device velocity to achieve the proposed performance standard, the open area of the device would need to be twice as large as it would be to achieve the approach velocity, and the overall size of the device or screen would have to increase accordingly. Doubling the size of the intake structure will inevitably increase costs significantly.

For another example, with respect to branched piping, which is integral to EPA's analysis of the other two technologies, the Agency provides little or no description of what might be involved as an engineering matter and instead presents two cost curves with equations. EEA, p. 6-7, App. A, p. 30. The import of the equations and their derivation are never explained; review of the Cost Research Report shows that EPA included nothing further about this technology there. Thus, it is impossible to tell what components EPA considered as part of "branching," much less assess whether its engineering assumptions and cost estimates are correct. As for enlargers, EPA included no analysis of the engineering attributes of this technology in any of its reports and presents only cost curves, so any meaningful critique is impossible.

Having provided little or no description of its "branching" technology, EPA proceeded to assume that velocity caps would be installed on branched intakes. While EPA never says this outright, it appears to be the case given that EPA's cost estimate assumes that a facility would install between four and 46 velocity caps, each on a single intake pipe. EEA, p. 6-7; App. A, pp. 28-30. EPA further assumes that it is possible to install four velocity caps in one day (two days if the water is deep). Id. It is impossible to tell, based on EPA's description, exactly why and how it arrived at the conclusion that a branched configuration would be a standard means of designing and installing velocity caps, much less that it was possible to install four caps per day. In fact, designing individual velocity caps to cover an intake area of only 20 square feet is not consistent with conventional engineering practice for power plants, regardless of size, and EPA provides no evidence that it is. <FN 92>

Had EPA obtained actual data, it would have found that most power plant intakes that include velocity caps include one to three caps and associated pipes, which are custom-made and far more expensive than EPA's off-the-shelf estimates. This is because velocity caps, as EPA concedes, can be used only offshore. To provide adequate protection from wave action and ice, offshore intakes typically are located at a water depth of 20 feet or greater. Such depths may exist only far from the new facility, requiring longer piping. Piping for offshore intakes at power plants cannot lay on the surface but must

be buried deep enough to protect it from damage by ice, boats, fishing equipment, and other hazards. If the substrate is soft and amenable to cut-and-cover operations, dredging is a normal practice. Where the substrate is rock or other hard material, tunneling is used. Both techniques are far more costly than EPA's assumed practices <FN 93> and are not used in "atypical conditions," as EPA assumed they would be. EEA, App. A-27. As a result, even small plants simply would not design a branched intake of the type EPA has assumed would be practicable. Therefore, we urge EPA to reconsider its engineering assumptions and develop cost estimates based on more credible designs and installation assumptions.

For passive screens, EPA analyzed the cost of only one type of screen – the wedge-wire screen. Here too, EPA assumed the use of branched piping, which for this type of screen is a reasonable assumption. EPA also assumed, however, that such screens would become technically infeasible at flows of over 50,000 gpm. EEA, p. 6-5. This is simply not the case. In fact, had EPA inquired, it would have found that wedge-wire screens are in operation and working well to minimize fish losses at several baseload power plants with far higher flows than EPA analyzed (Veneziale 1991; EPRI 1999).

With the increased size of these screens comes increased cost, both capital and O&M, as one would expect. The installed cost for the Eddystone Station bulkhead-mounted wedge-wire screen system on the Delaware River was estimated to be $4.1 million (Veneziale 1991). But by eliminating this alternative for higher flows and characterizing it as a technology designed to reduce velocity (which EPA associates with protection of fish from impingement), EPA avoided making any comparison of the costs and performance of this technology versus the alternative it selected for entrainment protection – that is, recirculating cooling. While wedge-wire screens do nothing to reduce the amount of intake flow, they nevertheless can make appreciable reductions in entrainment in appropriate situations. See EPRI Technology Review.

Footnotes

92 EPA appears to have collected most of its engineering and cost data by a survey of vendors, rather than examining data from real power plants of varying sizes. See Cost Research Report, p. 15. For velocity caps, however, EPA does not list any contact or source. EPA says that costs for velocity caps are driven by installation and appears to have assumed that installation costs of velocity caps would be "similar" to those for travelling screens. EEA, p. 6-6 to 6-7, App. A, pp. 28-30; Cost Research Report, pp. 25, 35-37. UWAG believes EPA's costs are inadequate. It is evident that EPA's estimated equipment costs, which the Agency says equal roughly 25% of the installation cost, include only the cost of the caps and not the "manifold inlet system" (Cost Research Report, p. 25) or the additional pipe that would be necessary for an offshore structure (much less one branched in four to 46 different directions, as EPA says it would be built). If these required costs were included, the installation costs of velocity caps would be substantially higher than the values EPA has presented.

93 EPA says that the cost for installing the velocity-reduction alternatives can increase two to four times if dredging is required. It is not clear what "dredging" is included in this estimate, but it does not appear to include manifold systems or additional piping. Cost Research Report, pp. 7-8.

EPA Response

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

See response to comment 316bNFR.068.106 for information on the intake designs discussed in the proposed rule.

See response to comment 316bNFR.001.001 for information on the intake configuration.

Comment ID 316bNFR.068.108

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Subject Matter Code 17.0

Best Technology Available-Technologies

EPA Must Consider Real-World Limitations on the Availability of its Preferred Technologies

Besides the inappropriate engineering assumptions EPA made in specifying BTA technologies for velocity (which, by extension, undercut EPA's estimates of cost), EPA also failed to recognize that, in some situations, none of these technologies may be "available." As EPA's contractor SAIC pointed out, heavy debris loading and biofouling are concerns with wedge-wire screens. EEA, App. A, p. 27. In fact, such screens generally will not be practicable in areas of extreme debris loading and biogrowth. EPRI Technology Review p. 2-7. In addition, site-specific factors (e.g., debris loading, which results in higher through-slot velocities) will influence organism interaction with the screen, making such screens less effective in some cases.

As for velocity caps, such devices can be used only for submerged, offshore intakes where there is sufficient depth to protect the cap against waves, ice, and other hazards. Where these conditions are not met, a velocity cap is not feasible. And EPA's notion of an infinitely branched intake simply is not credible as an engineering matter, given the significant dredging that would be required to install the complex manifold system needed to support the many individual velocity caps required for even low volume flow rates.

In summary, EPA selected three technologies for analysis with the assumptions that one or more will be (1) practicable to install and operate and (2) biologically effective in all circumstances and locations. EPA provides no support for these assumptions and arbitrarily has eliminated other technologies that may be equally or more practicable and/or effective for minimizing entrainment and impingement losses of organisms at CWISs.

EPA Response

EPA is not assuming that these technologies could, or should be, used to meet the requirements of the final new facility rule for every facility. This rule was specifically written to allow site-specific determinations by the facility itself as to which technologies would be most appropriate and effective based on their knowledge of conditions at the facility and in the waterbody. These technologies were chosen as representative technologies which have costs that would be representative (or conservative) and were assumed for costing purposes only. EPA has reviewed the available literature on wide mesh wedgewire screens and finds that this technology has been used in a wide range of site-specific conditions and therefore considers it available. However, fine mesh screens will need to be evaluated to determine their efficacy on a site specific basis. Velocity caps have been installed on numerous submerged intake structures and appear to be an available technology for many different site conditions. Branching of intake structures is an option for minimizing velocity as well as increasing the face of the intake structure. The option of branching may not be appropriate for all site condition, but it was chosen to represent a conservative cost option. For a more detailed discussion see the

discussion on this technology in the Technical Development Document.

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Subject Matter Code 14.1

Minimization of Impingement/Entrainment at Littoral

EPA's Proposed Requirements for Additional Entrainment/Impingement Minimization Technologies Are Unnecessary and Unduly Vague, and Its Assessment of Those Technologies was Inadequate

EPA recognizes that it is not always possible for facilities to locate CWISs in areas outside of sensitive biological areas (which are, according to EPA, littoral zones, estuaries, and tidal rivers). The proposed rule therefore allows facilities to locate CWISs in these sensitive areas, so long as they implement "additional design and construction technologies that minimize impingement and entrainment of fish, eggs, larvae and maximize survival of impinged adult and juvenile fish." See, e.g., proposed § 125.84 (b)(3)(iv), 65 Fed. Reg. 49,117-18. Under proposed § 125.86(b)(6), the permittee would be responsible for examining available technologies and developing a proposal for meeting this standard (even though EPA does not say what "minimization" means or when this standard will be deemed satisfied).

This standard is too vague to inform the regulated community of what it requires. UWAG agrees that EPA should not – indeed, could not – require the use of a single technology to meet this standard whatever it may mean. This is because, as EPA notes (65 Fed. Reg. 49,089) and all the available data and experience demonstrate, the availability and efficacy of CWIS technologies depend on site-specific factors – just as do the technologies EPA chose as the basis for its performance standards. But this does not mean that EPA may establish a requirement so broad and ambiguous that an applicant would have no way of knowing what technology would be approvable. Furthermore, such a requirement will only perpetuate uncertainty and exacerbate permitting delays – two outcomes EPA and UWAG agree must be avoided.

UWAG also questions the biological necessity of this requirement, given that EPA has done no quantitative assessment of what incremental reduction it will produce beyond the other requirements EPA proposes or the likely benefits of any such reduction. At best, EPA's analysis of the need for this additional requirement is speculative and anecdotal. See 65 Fed. Reg. 49,089.

In addition, we question EPA's decision to consider in connection with this requirement the engineering and cost factors for only one of the many fish protection technologies available – Ristroph screens. Evaluation of this single option, when EPA has identified many others as potential candidates (id.), gives neither EPA nor the regulated community a fair idea of the engineering and cost attributes for the range of technologies that the Agency apparently intends to require permit applicants to assess. EPA has provided no information from which one could judge whether the costs EPA has anticipated – assuming they are correct – are higher or lower than those that would be incurred for other technologies. Putting aside the question of whether it is appropriate for EPA to set a standard that is so completely open-ended, without giving any interpretation of how it will be applied in practice, EPA should at least have done a more complete analysis of the potential costs of such a requirement.

EPA also does not explain clearly why it chose Ristroph screens to serve as the example, for costing

purposes, of technologies that would achieve its standard. EPA may have believed that such screens would be "available" in many applications. If so, it is not clear why EPA concludes that this technology is widely available and can achieve the proposed standards. EPA should explain its assumptions about this technology.

Besides the 0.5 fps limit and the "commensurate with a closed-cycle cooling" volume limit, EPA proposes other volume (flow) limits for particular types of waters. Part VII.F. above addresses these limits.

EPA Response

EPA has revised the design and construction requirements. See the preamble to the final rule. EPA recognizes that as proposed there were situations where additional requirements would not provide significant additional reduction in impingement and entrainment when taken in context with the other requirements of the rule. In some instances, these additional requirements do provide additional impingement and entrainment protection and they are very affordable and technically practicable.

The final rule adopts a two-track approach. Track I specifies intake flow, velocity and source water-based flow requirements, as well as, where specified conditions exist, selection and implementation of design and construction technologies that are most effective in minimizing impingement mortality and entrainment of all life stages of fish and shellfish. New steam electric facilities that withdraw greater than 2 MGD and less than 10 MGD are not subject to the intake flow requirements but must select and implement design and construction technologies that minimizing impingement mortality and entrainment of all life stages of fish and shellfish. Under Track II, a new facility can demonstrate a level of performance comparable to Track I through the use of any technologies, including design and construction technologies. Thus, the final rule provides greater clarity and focus regarding when the use of design and construction technologies is necessary, as well as a high degree of flexibility to permittees to optimize and apply design and construction technologies.

EPA has included additional data in the preamble and record addressing known ranges of efficacy achieved using design and construction technologies. However, as the site-specific application of these requirements reflects, it is not feasible to assess optimization of such technologies for all new facilities on a national basis due to the numerous technologies that exist and the site-specific factors that affect their selection, combination, and optimization. Nevertheless, these technologies are technically available and economically practicable and can function to reduce impingement and entrainment beyond those levels achieved through implementation of the other Track I requirements.

With regard to engineering and cost estimates, the document referenced was used to support costing for the proposed new facility rule, but was not intended to constitute a comprehensive review of technology efficacy and cost. In the document, EPA selected several technologies that were reasonable, given data available for new facilities, for purposes of performing cost analyses for new facilities. EPA's record, as a whole, fully considers available data on technologies that can be used to address the location, design, construction and capacity of cooling water intake structures. EPA has reviewed hundreds of documents and papers that contain information on the design and efficacy of cooling water intake structure technologies. Documents which summarized EPA's knowledge were

developed and placed in to the record. (See Preliminary Regulatory Development Section 316 (b) of the Clean Water Act —— Background Paper Number 3: Cooling Water Intake Technologies and Supplement to Background Paper 3: Cooling Water Intake Technologies in Docket #1-5069-PR and #1-5070-PR). In addition to the numerous documents that have been placed in the docket, EPA developed documentation that summarizes available information on the efficacy of technologies (see the Technical Development Document).

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

EPA's Assumptions about what Alternatives Facilities May Use to Avoid Closed-cycle Cooling Are Wholly Unsupported

For purposes of analyzing costs, EPA assumed that facilities would choose the least expensive technology that could be used at that site to achieve the performance standard. For example, to analyze extending the intake pipe out beyond the littoral zone to avoid having to install cooling towers, EPA assumed that the littoral zone is only 25 meters wide, so that one could get beyond it by extending the pipe or canal only 75 meters. See EEA, p. 6-2, 6-13, 6-14. EPA further assumed that the CWIS would not infringe on any littoral zone extending from the opposite shore. See EEA, p. 6-2. In fact, EPA used that assumption as the basis for concluding that four of the seven real plants EPA identified for purposes of its cost analysis would not require cooling towers. But EPA had no record support for either of its assumptions about the littoral zone.

UWAG believes that EPA has significantly underestimated the size of the littoral zone and, thus, the feasibility and cost of extending the CWIS beyond it. The cost data are extremely important, because EPA uses those costs to extrapolate the costs for another 14 facilities – almost half its database. See EEA pp. 6-13 to 6-15. But, as shown above, in some waters (perhaps many) the littoral zone as EPA has defined it will be far larger than EPA has assumed.<FN 94> See Part VII.D. above. EPA examined a relatively small set of actual facilities (only seven) when it made its projections of the base case, and it knew where those facilities were located. Surely it would not have been unduly burdensome for EPA to undertake at least a minimal inquiry to assess whether its assumptions about the location of the littoral zone were correct. There is no evidence that this was done, nor has UWAG found in the record any other information supporting EPA's assumptions.

EPA also assumed that applicants proposing shoreline intakes often withdraw water from below the surface. EEA, p. 6-3. This is true. But EPA appears to have assumed in addition that such intakes involve an intake canal that could somehow be deepened to get the intake opening "below" the littoral zone. Id. It is not clear what EPA's consultant means by getting below the littoral zone. Because EPA relies on this assumption to justify part of its cost estimate, it needs to provide some explanation that makes sense.

Footnotes

94 In fact, for the Moss Landing Power Plant, the staff of the state permitting board are reported to have estimated that the cost of extending the intake structure offshore would be approximately $10,000,000 (Raimondi and Cailliet 2000). EPA nowhere clearly states what the cost of extending pipes beyond the littoral zone would be, but this figure clearly is significantly higher than any estimate EPA considered. See EEA, 6-16, Table 6-11.

EPA Response

See response to comment 316bNFR.068.004.

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

DRY COOLING NEITHER IS NECESSARY TO MINIMIZE AEI NOR QUALIFIES AS "BTA"

EPA says it is considering whether to require dry cooling as "BTA." 65 Fed. Reg. 49,080-81. UWAG believes there is no plausible basis for setting BTA requirements based on dry cooling. UWAG's consultants have done an analysis of wet and dry cooling systems for combined cycle power plants, attached to these comments as Appendix F. Their analysis shows how costly would be a rule that forced the widespread installation of dry cooling towers at combined-cycle plants alone.

Assuming that 100% of new combined-cycle capacity over the next 20 years will be constructed with either wet or dry cooling towers, the projected costs are as follows:

Table 3. Summary of Projected Costs for Wet Cooling Systems*

Geographic Group	Capital Costs ($ Millions)	Total O&M($ Millions)	Total Costs($ Millions)
1 - Northeastern U.S.	791.3	347.9	1,139.2
2 - Upper Central U.S.	605.6	237.9	842.5
3 - Southeastern U.S.	1,190.6	547.3	1,738.2
4 - Lower Central U.S.	1,020.1	506.9	1,527.0
5 - Western U.S.	774.3	344.5	1,118.8
Total U.S.	4,382.2	1,984.5	6,366.7

* All costs are expressed in terms of July 1999 dollars where future values were escalated with a 4% annual rate and present worth values were determined with a 7% annual discount rate.

Table 4. Summary of Projected Costs for Dry Cooling Systems (2000-2020)*

Geographic Group	Capital Costs ($ Millions)	Total O&M Costs($ Millions)	Total Costs ($ Millions)
1 - Northeastern U.S.	1,388.5	616.5	2,005.0
2 - Upper Central U.S.	1,064.2	422.9	1,487.1
3 - Southeastern U.S.	2,105.1	974.4	3,079.5
4 - Lower Central U.S.	1,813.3	902.9	2,716.2
5 - Western U.S.	1,348.7	608.8	1,957.5
Total U.S.	7,719.8	3,525.5	11,245.3

* All costs are expressed in terms of July 1999 dollars where future values were escalated with a 4% annual rate and present worth values were determined with a 7% annual discount rate.

An estimate of the cost per megawatt can be had by referring to the new capacity estimates in Tables C1 through C10 of Appendix F to these comments.

While we understand that EPA believes many new power plants will not be subject to § 316(b) because they do not directly withdraw surface waters of the United States, UWAG questions whether this will be true. Equally important, EPA has suggested it may impose limits on municipal or other surface water suppliers, who in time would need to find some way of enforcing compliance by the water user, making analysis of a 100% requirement highly relevant. Also, the efficiency of dry cooling depends on the ambient dry-bulb temperature. Without data on where the anticipated facilities will be built, it is not possible to do any meaningful analysis of the costs and practices associated with imposing dry cooling just on EPA's subset.

Regionally and nationally, the estimated capital and total O&M costs for dry cooling systems exceed those for wet cooling systems by about 75%.<FN 95> At $6.4 billion and $11.2 billion for wet and dry systems respectively, the total costs are significant. If annualized at a 7% rate for the 20-year study period, the estimated national costs for wet and dry cooling systems at new combined-cycle power plants are $0.6 billion/year and over $1 billion/year, respectively.

The analysis in Appendix F reaches the following conclusions:

1. By almost any economic measure, a dry cooling system costs about 75% more than an equivalent wet cooling system. The higher cost is a reflection of two inherent characteristics of dry cooling: lower performance than wet cooling and greater sensitivity to climatic conditions.
2. The importance of ambient dry-bulb temperature in determining the performance of a dry cooling system means climatic conditions are important. Therefore, depending on climatic conditions, certain locations in the country will have a higher probability of incurring larger dry cooling energy penalties.
3. Dry cooling systems have greater and more expensive energy penalties than wet cooling systems. EPA has not properly accounted for these significant penalties. The highest probability for incurring an energy penalty will be during the warmest periods of the year, when the demand and the price for electrical power will be greatest.
4. Dry cooling systems use less water than wet cooling systems. But the unreliability of these systems during times of peak power demand, as well as the excessive capital and O&M costs, makes this closed-cycle cooling technology less desirable than wet cooling systems.

Footnotes

95 Many planned new facilities will not be economically practicable if dry cooling is required. See, e.g., Dow Jones Newswires, Key Span, Com Ed Scrap Plans for 500-MW Brooklyn Power Plant, July 6, 2000.

EPA Response

EPA has determined that, for this national rule, dry cooling does not represent best technology available for minimizing impingement and entrainment for the reasons described in Section V.C of the preamble to the final rule. EPA notes that the capital and O&M costs presented by the commenter for dry cooling are not comparable to the Agency's estimates of a dry cooling based regulatory alternative as presented in the Economic Analysis.

EPA notes that the projected cost examples summarized by the commenter are discussed in detail in response to comments 316bNFR.368.001 through 316bNFR.368.012. Generally, EPA finds that the methodology used by the commenter for estimating the scaled cost on a national level to be overly

simplistic, and misleading, especially for the case of wet cooling. The commenter fails to account for the projected baseline cooling systems at the projected facilities, includes cost components (in both capital and operation and maintenance costs) that are not attributable to this rule (such as the installation costs of surface condensers and associated conduit costs), and generally does not document the basis for a majority of its costing models. These issues are discussed in detail in responses to comments 316bNFR.368.001 through 316bNFR.368.012. Despite demonstrating a thorough knowledge of the conceptual theories of cooling technologies for electricity generation, the commenters basic assumptions underpinning their summarized analysis cause the projected costs presented to be dramatically overestimated, and not directly comparable to the cost estimates developed by EPA for this rule.

Regarding the commenter's questioning of EPA estimates that many new power plants will not be subject to this rule because they do not directly withdraw surface waters of the US (and their concern with EPA's proposal discussion of the imposition of this rule on municipal or other surface water suppliers), EPA points to its detailed and thorough data collection process for determined the scope of this rule, as described in the Economic Analysis. EPA notes that the final rule generically does not apply to municipal or other surface water suppliers.

EPA also disagrees with the commenter's statement that, "without data on where the anticipated facilities will be built, it is not possible to do any meaningful analysis of the costs and practices associated with imposing dry cooling on EPA’s subset [of regulated facilities]." EPA contends that by using a national mean annual energy penalty and mean annual cost estimates, the analysis of dry cooling presented by EPA for the final rule provides realistic estimates of the potential costs of the hypothetical regulatory option.

EPA generally agrees that capital and operation and maintenance costs for dry cooling systems exceed those of wet cooling. However, due to the fact that the commenter's analysis contains fundamental assumptions, such as inclusion of surface condenser costs for recirculating wet cooling comparisons and no recognition of baseline cooling systems projections, EPA views the commenter's comparative cost estimates to be, in the end, incomparable to the Agency's estimates.

EPA agrees with the general conclusions of Appendix F summarized by the commenter regarding dry cooling, but points out that the comparative cost estimates are not entirely appropriate, though generically applicable.

Comment ID 316bNFR.068.112

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Subject Matter Code 19.2

Baseline Biological Characterization Study

As a general matter, pre-operational characterization studies should focus on the abundance of adults of affected species, the baseline level of anthropogenic mortality, thermostratification (for determining the best "location" for the CWIS), and the nearness to the proposed CWIS location of spawning or nursery areas or corridors of travel of impingeable organisms.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.068.113

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Terry M. Hogan & David E. Bailey

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Baseline Biological Characterization Is Unnecessary for Facilities with Highly Protective Technologies

For new facilities that opt to install highly protective technologies, such as wet recirculating cooling towers (and perhaps other low-flow or low-velocity options), BBCs are unnecessary. EPA acknowledges that wet recirculating cooling towers greatly reduce water flow (by 72-98 percent, according to the Agency) in comparison to once-through systems. 65 Fed. Reg. 49,103 col. 3. While one cannot assume a direct correlation between flow and entrainment, as discussed earlier, wet recirculating cooling towers are a biologically effective way of reducing impacts in most cases. <FN 96> Any facility desiring to use such cooling towers, therefore, should not be required to do pre-operational monitoring.

In a deregulated environment, the ability to avoid lengthy pre-operational studies will provide a strong incentive for new facilities to install wet recirculating cooling towers. As these comments make clear, however, cooling towers are not the only viable technology for significantly reducing entrainment and impingement, and certainly not always the best technology available. If EPA nonetheless prefers cooling towers, it makes sense to design the rule with market incentives favoring that technology.

Although no pre-operational monitoring should be required, facilities that chose to install closed-cycle cooling would be subject to some post-operational monitoring, though not necessarily for the entire permit term, in order to evaluate the effectiveness of the chosen technology in operation. This monitoring should be tailored to the species being protected and the other characteristics of the site.

Footnotes

96 As discussed elsewhere in these comments, in the great majority of instances cooling towers are not an economically practicable solution.

EPA Response

While EPA believes this final rule will significantly increase protection for aquatic communities, the Agency has determined that the proportional flow requirements represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA rejected dry cooling for reasons discussed in the preamble and elsewhere in this comment response document. EPA examined the performance of existing facilities based on data from the section 316(b) industry survey in terms of proportional flow to determine what additional value could be used as a safeguard to protect against impingement and entrainment, (especially in smaller waterbodies, where multiple intakes are located on the same waterbody, or in waterbodies where the intake is disproportionately large as compared to the source water body). EPA found most existing facilities meet these requirements. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet these requirements. EPA recognizes that some measure of judgment was involved in establishing the specific numeric limits in these requirements and that these requirements are conservative in order to account for multiple intakes affecting a waterbody. In

particular, the 1 percent value for estuaries reflects that the area under influence of the intake will move back and forth near the intake and withdrawing 1 percent of the volume of water surrounding the intake twice a day over time would diminish the aquatic life surrounding the intake. The 5 percent value mean annual flow reflects an estimate that this would entrain approximately 5 percent of the river or stream's organisms and a policy judgment that such a degree of entrainment reflects an inappropriately located facility. Nevertheless, because they address important operation situations and appear to be achievable for new facilities, EPA believes they are appropriate to this rule.

EPA did not adopt the commenter's approach regarding a limit to the proportion of the flow during droughts since such actions may have implications for energy reliability, that is it may affect energy supplies/availability during periods of peak energy demand. The use of percentages of average annual flow or 7Q10, as prescribed in the rule, is a more indicative approach for a national design standard.

For additional information please see 316bNFR.508.014.

Comment ID 316bNFR.068.114

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Terry M. Hogan & David E. Bailey

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The Proposed BBC Is Not Appropriate for All Sites

Preexisting Data Should Be Used

EPA's proposed rule does not prioritize the use of preexisting data as it should. While allowing that "with the Director's approval, you may use existing data instead of actual field studies" (65 Fed. Reg. 49,119 col. 3), the rule also says that the needed information will "likely be derived from new, site-specific studies." 65 Fed. Reg. 49,097 col. 1.

For many major waterbodies on which electric generating stations are already sited, qualitative, and in some cases quantitative, information on aquatic species is already available. For example, where a new facility is proposed for an existing power plant, the existing plant may have collected biological data from which an assessment could be made. Information should already be available concerning both the identities of species potentially vulnerable to entrainment or impingement – principally, species with pelagic life stages – and the seasons in which vulnerable life stages are near the CWIS. At such sites, the additional information to be provided by a single year of sampling in the vicinity of a proposed CWIS would probably not be necessary.

The utility industry already is conducting long-term monitoring and research programs on many freshwater rivers and reservoirs (e.g., the Upper Illinois Waterway, areas of the Mississippi River, much of the Ohio River, and many mid-south and southeastern reservoirs) (EA 1993; EA 1999b; LaJeone and Monzingo 2000; Lohner 1999). The new facility rule should acknowledge that further data collection will typically not be necessary where significant studies are already underway. At a minimum, the rule should clarify the conditions under which existing data can be used.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.068.115

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Subject Matter Code 19.2

Baseline Biological Characterization Study

Study Needs Will Vary Depending on the Waterbody

In circumstances where existing data are not sufficient and new sampling must be done, the sampling program should be tailored to the site. The requirements in the proposed rule for the BBC may be overly conservative and misallocate monitoring resources, or conversely the BBC might be insufficient to characterize the species in some particularly complex and changing environments. For example, the BBC might require too much monitoring for a waterbody in a static or controlled environment, such as a lake, reservoir, or river stocked with commercial and recreational fish. At such a site, a year-long study of impingement effects would not be appropriate because of the presence of highly managed representative species. Furthermore, a study of entrainment effects might not be warranted if the stocked fish were unable to reproduce (as are hybrid striped bass, lake trout, and Pacific salmonids in the Great Lakes).

In tidal rivers and estuaries, however (as well as at the confluence of major freshwater rivers), complex hydrodynamics and water quality conditions might require more intensive sampling to characterize aquatic organisms likely to be in the vicinity of the intake. For these reasons, UWAG favors an approach to pre-operational monitoring that would allow the permittee, in collaboration with its regulatory agency, to design a site-specific sampling program. EPA, of course, could promote a consistent process for such studies through guidance.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.068.116

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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Some of the BBC Requirements Are Ambiguous

The only guidance as to the scope of the BBC is that the study must begin one year before the permit application is submitted, that it be conducted over a period of one year, and that the data be collected in "the area of influence of the cooling water intake structure and at least 100 meters beyond." 65 Fed. Reg. 49,120 col. 1. No information is provided, for example, about how often to sample during the one-year period – weekly, monthly, or annually?

The EEA indicates that EPA's cost estimate of $32,000 per facility is based on biweekly sampling. But biweekly sampling of what, and for how long? Because the post-operational monitoring requires at least biweekly samples during the peak of reproduction, larval recruitment, and meroplankton abundance, EPA may be envisioning a similar level of effort for the BBC study. If this is true, it should be spelled out. Additionally, it is not clear what frequency of sampling EPA envisions for adult and juvenile fish.

EPA Response

EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicant must conduct a considerably more rigorous study if they seek to demonstrate that alternatives to the Track I requirements will equivalently reduce impingement and entrainment at a site.

At § 125.87, today's final rule requires that both Track I and Track II facilities must conduct biological monitoring for impingement and entrainment to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish)

impinged or entrained during operation of the cooling water intake structure. These data would also be used by the permitting authority in subsequent permit terms to determine whether additional or modified design and construction technologies are reasonably necessary (see discussion of § 125.89(a)(2) in D. below). The facility would be required to conduct impingement and entrainment sampling over a 24-hour period no less than once per month when the cooling water intake structure is in operation and report results to the Director annually. After two years, the Director may approve an applicant's request for less frequent biological monitoring if the facility provides data to support the request showing that less frequent monitoring would still allow for the detection of any seasonal and daily variations in the species and numbers of individuals that are impinged or entrained. The Director should approve a request for reduced frequency in biological monitoring only if the supporting data show that the technologies are consistently performing as projected under all operating and environmental conditions and less frequent monitoring would still allow for the detection of any future performance fluctuations.

Comment ID 316bNFR.068.117

Author Name	Terry M. Hogan & David E. Bailey
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Subject Matter Code 19.2

Baseline Biological Characterization Study

EPA Has Underestimated the Cost of Implementing Some BBCs

Under the proposed rule, the BBC would determine the kinds of organisms present, their abundance, their life stages, and the duration of occurrence. 65 Fed. Reg. 49,097 col. 1. These data, which must be quantitative, would have to be compiled for eggs, larvae, post larvae, juveniles, and adults for both fish and shellfish. Id.

The data collected in the BBC study would be compared to similar data collected during each permit reissuance cycle "to evaluate the efficacy of the location, flow, and velocity requirements." 65 Fed. Reg. 49,097 col. 1. Thus, the BBC data must be of sufficient quantity and quality to allow such evaluations to be made accurately. The data would need to be appropriately certified through established, but unspecified, quality assurance procedures. Id.

EPA estimates that a BBC study meeting these requirements would cost only $32,000. But this estimate is roughly an order of magnitude too low to accomplish the stated objectives for waterbodies with complex hydrodynamics and aquatic communities, such as some estuaries and some freshwater rivers. Moreover, the accuracy of the data will be critical, since they will be used to determine whether significant potential for AEI exists and whether further mitigative measures or technologies must be used. The data will also be the benchmark against which future performance is measured, and they may serve as the mechanism for approving or disapproving a permit, either initially or during a later renewal period. The need for accuracy will lead to significant costs.

According to the proposed rule, information on occurrence, abundance, and types of organisms must be provided on (1) fish eggs, larvae, and post-larvae; (2) juvenile and adult fish; and (3) shellfish. A brief accounting of the complexities and difficulties of collecting such data will help to make clear how expensive the effort may be in certain cases.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.068.118

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Subject Matter Code 19.2

Baseline Biological Characterization Study

Eggs, Larvae and Post-Larvae

As acknowledged in the proposal, any assessment of the vulnerability of eggs, larvae, or post-larvae will depend on the duration of occurrence (how long are they at risk?) and their abundance in the proposed intake area (how many are at risk?). Most temperate zone North American freshwater fishes are spring and summer spawners, though there are many exceptions (EA 1995, Auer 1982). Thus, to cover the duration of occurrence for most species, studies would need to last a minimum of three months (often May, June, and July), and more likely five (April through August). Where species are present that do not fit this usual warm-season spawning pattern (e.g., Pacific salmon, Atlantic tomcod, four-bearded rockling), the sampling duration would need to be expanded further.

The proposed rule suggests that sampling can be confined to the immediate area of the proposed CWIS. In circumstances where there is significant spatial variability of aquatic organisms, however, such an approach is shortsighted. The applicant and the permitting agency need to know whether the data collected near the proposed CWIS are representative and whether any post-operational changes in abundance are due to the intake and not other factors. Thus, multiple sampling locations are needed – two or three at a minimum, possibly more. In flowing water environments, the minimum of three would need to include one upstream of the proposed intake, one near it, and one downstream. In a lake or reservoir, the minimum would be one near-field location and one far-field. More locations would be necessary to evaluate possible impacts caused by the facility's discharge or existing facilities nearby.

Further complicating the situation is the fact that eggs and larvae at a particular location may have originated a considerable distance away and been transported to the intake by the flow of the river, or by near-shore currents or tides in estuarine and marine environments. This transport of eggs and larvae must also be assessed. In any case, it is clear that multiple locations are needed, not a single location near the intake as EPA suggests.

Larval abundance varies tremendously, with multiple peaks (usually corresponding to different species) occurring over the course of the spawning period (Applied Science Associates 2000, EA 1995). Frequent sampling is necessary lest these peaks be missed and the abundance of key species (taxa) be seriously under- or over-estimated. A typical larval fish program involves less frequent sampling (perhaps every other week) during the beginning and end of the spawning season when densities are typically lower, and more frequent sampling (weekly or even twice a week) in the middle of the spawning season when densities are usually highest. Based on a typical five-month spawning period, this would require 17-30 sampling events per location. Sampling in complex estuarine areas would likely be even more intense.

Finally, egg and larval density often vary horizontally (e.g., from one bank to the other in rivers), vertically (i.e., by depth in the water column), and on a diel basis (Bergmann 1981, EA 1990). Thus

larval samples are typically collected along a transect, at two or more points in the water column, and both day and night. If sampling is not stratified in this manner, the estimates of abundance, occurrence, and distribution may be erroneous.

In summary, a freshwater larval fish study that is required to describe the abundance, occurrence, and distribution of organisms and that will be used in the future to assess possible post-operational impacts would typically consist of the following:

No. of sampling periods	17-30
No. of locations (transects)	3-4
No. of points along each transect	2-4
No. of depths at each point	1-3
No. of times each location would be sampled during 24 hrs	1-2
Total number of samples	102-2880

In estuaries and tidal rivers, tides and variable salinity patterns result in additional factors that may need to be incorporated into the sampling program, thus sample size can be even larger than for freshwater systems.

The actual collection of the samples probably represents only one-half to one-third of the actual cost of the program. Typically, the time and expertise required to sort the eggs and larval fish from the other matter in the samples and correctly identify them to life stage and species will cost considerably more than the collection effort. Particularly in rivers and estuaries, when spawning occurs during the high-flow season the samples may contain a great deal of detrital matter that must be sorted through to find the organisms of interest. This detrital matter not only adds to the time required for sorting of the samples, but also affects the amount of sample rework necessary to meet quality standards. Thus, overall BBC costs may be considerably higher for estuary/tidal river locations.

The level of sampling effort outlined above is by no means what UWAG thinks appropriate for performing every § 316(b) study; that depends on the characteristics of the site. But it does represent what may be necessary to generate useful results in some cases.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.068.119

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Subject Matter Code 19.2

Baseline Biological Characterization Study

Juvenile and Adult Fish

Movement of fish is common in all sorts of waterbodies. Much of this movement is associated with spawning (e.g., walleye, sauger, northern pike, white bass, and many sucker species in fresh water; stripped bass, American shad, blueback herring in estuaries), but movement related to water fluctuations and temperature preferences and to overwintering locations is also common (e.g., white perch, largemouth bass) (Tranquilli et al. 1981). Even species often thought of as sedentary (e.g., channel catfish) (Fago 1999) move significantly from season to season. Thus, any survey designed to assess the vulnerability of fishes to impingement needs to be conducted at least seasonally. Monthly (if not weekly) sampling during periods of high movement (e.g., spring) or when young-of-year fish are more abundant (summer and early fall), or when fish may be more vulnerable (e.g., winter) would often be necessary. This approach would yield between twelve and 24 sampling events for the one-year study period.

At least three locations would be needed, one near the proposed intake and two nearby (e.g., upstream or downstream of the proposed CWIS in riverine situations). Sampling along both banks is often appropriate in large rivers, and more sampling may be necessary where the habitat is complex (e.g., if there are numerous backwaters and side channels). At each location, multiple sets of sampling gear would be needed to sample the large waterbodies on which power plants are typically sited. On large freshwater rivers, the preferred gear would probably be seining and electrofishing (Seegert 2000). On lakes and reservoirs, the gear would usually be electrofishing and gill netting (McDonough and Hickman 1999). In estuaries and tidal rivers, seining and midwater trawling and bottom trawling would be typical (Applied Science Associates 2000). In some cases, additional gear might be needed. For example, sturgeon are rare or at least uncommon in riverine electrofishing or seine collections but are often common at the same sites in gill net collections (EA 1987).

In summary, to describe adequately adult/juvenile fish duration, abundance, and distribution, a one-year sampling program in freshwater environments would need to include the following elements:

No. of efforts	4-8
No. of locations per effort	3-6
No. of gears	2-3
Totals	24-144

As noted above, because long-term studies of adult fish are underway at a number of sites, some facilities may have enough data already available to describe the species and their seasonal occurrence in the waterbody.

The proposed rule would require that quantitative data be collected. However, information about species population size is rarely available. Without such estimates, it would be difficult to assess AEI

or design well-calibrated BTA technologies that are not simply over-conservative. Thus, for some facilities, mark and recapture studies or other intensive sampling programs (Young et al. 1988) may be necessary to estimate population size. If such studies were necessary, the level of effort would increase considerably.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.068.120

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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Shellfish

Unionid mussels are a concern in many fresh waters in the eastern two-thirds of the country, and endangered or threatened mussels exist over much of this area. See, e.g., "Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity" (Master et al. 1998). Impingement of adult mussels is not a concern, but entrainment of glochidia (their larval form) might be. This would typically be addressed by determining whether a mussel bed is present at or near the proposed CWIS. In some instances, existing data regarding the location of mussel beds may be readily available from state or regional sources. Where such data are not available, however, a survey of potential mussel bed areas in the vicinity of the CWIS would be required.

In estuaries, decapods may be important recreational or commercial species (e.g., blue crabs in Atlantic Coast estuaries). Like fish, they have seasonal migrations that can bring them near cooling water intakes. Thus sampling may need to be expanded to include appropriate methods for capturing adult or larval movements.

EPA Response

Today's final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies. It also requires the permit applicant to select and implement design and construction technologies in specified conditions. These design and construction technologies may be modified by the permit director in subsequent permits. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I.

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Subject Matter Code 19.2

Baseline Biological Characterization Study

Cost Estimate

In discussing its own cost estimate for a BBC, EPA acknowledges that § 316(b) studies historically have cost "considerably more" than $32,000 but suggests that the lower EPA estimate is nevertheless appropriate because the BBC would generally be less comprehensive (and thus less expensive) than § 316(b) studies in the past, since the scope and level of detail required in the BBC are more limited than § 316(b) studies typically submitted. 65 Fed. Reg. 49,097.

UWAG disagrees with this assumption. Limiting the assessment to up to 10 key species may cut down slightly the amount of effort associated with data analysis and report preparation, but the field and lab components of the study (which account for most of the cost) are conducted in the same way whether two, ten, or 30 key species are involved.

Finally, UWAG disagrees with EPA's assumption that a single location near the proposed CWIS is adequate. The proposed rule requires at least two years of post-operational impingement and entrainment monitoring. 65 Fed. Reg. 49,121 col. 1. Based on this monitoring, EPA or the state may conclude that AEI would occur and require significant and costly mitigative measures. Few applicants would risk undertaking a two-year study of such importance with a bargain-rate sampling protocol.

Because of the potential that the BBC will trigger expensive CWIS modifications, any applicant will have to be confident that alleged impacts are due to the CWIS and not to other factors (e.g., other point sources, habitat, normal changes in population abundance, etc.). The only way these variables can be accounted for is if a proper, quantitative baseline has been established by stratified sampling. Since all future assessments will be measured against the baseline and there is only one opportunity to establish it, it will be extremely important to establish it properly.

Given the importance of the data in determining initial and potentially future permit requirements, facility owners will likely feel that a bare minimum program would not be adequate to protect against an erroneous decision regarding AEI. Without adequate guidance from EPA on the criteria that will be applied to the data, it is impossible to determine exactly how much sampling will be required. The statistical aspects of power plant monitoring programs were examined long ago (McCaughran 1977; Thomas 1977), yet more than 20 years later these insights cannot be applied to sampling program design without guidance from the regulatory agencies as to what constitutes AEI (e.g., how much of a decrease in a population would be adverse) and what certainty of detection is required.

Biological populations do not exist in a time and space vacuum. EPA's approach of looking at a single location near the proposed CWIS will be, in most cases, inadequate to establish a proper baseline. Because of the need to assess more locations, often at greater frequency than EPA has suggested, the cost of doing a BBC could be much larger than EPA supposes, as detailed in the following section.

It is beyond the scope of these comments to design an example program that would fully account for these factors, but even a simple sampling program that might provide adequate information for an uncomplicated estuarine location demonstrates the inadequacy of the EPA estimates. For the purpose of designing this exercise, the following assumptions are made:

*Alternate-week sampling year-round for free-swimming fish and shellfish in the littoral, pelagic, and benthic environments. Sampling conducted with beach seine, midwater trawl, and bottom trawl. Fifteen samples of each type during each sampling event. Samples analyzed in the field.
*Each type of sampling conducted by three-man crew during eight-hour day (three days per sampling event).
*Plankton sampling conducted on alternate weeks, but weekly during six-month period of most fish reproduction. Sampling conducted with 0.5m hoop net using five-min tows at 1m/sec. Fifteen samples per sampling event.
*Meroplankton sampling conducted by three-man crew during eight-hour day.
*Equipment use and materials costs of $150 per sampling day
*Labor costs of $25/man-hour
*Laboratory analysis of plankton samples for fish and shellfish $1.30/m3, about twice the cost of fish-only analysis for a large-scale field program that samples 10 times as much volume.
*No travel time or travel costs
*No additional time required for data management
*Minimal summary and analysis of data

As indicated in Table 5 below, this very minimal program for a proposed CWIS on an estuary, with several extremely conservative assumptions, would cost nearly five times what EPA has estimated. In actual practice, sampling programs are considerably more expensive due to time required to design the study, travel costs, higher equipment costs, higher sample analysis costs, time required for program management functions, data entry and management, and data analysis and interpretation. The actual total cost to conduct all of the necessary aspects of a Baseline Biological Characterization could easily be two or more times the value presented in Table 5, or approximately an order of magnitude higher than the EPA estimate.

{Table also scanned as an attachment: 316bNFR.068.121_Table}
Table 5. Estimated Costs for 1-year Source Water Baseline Biological Characterization in an Estuary

		Sample Event Type		
Phase		Nekton & Benthos	Plankton	Total
Field Sampling	Weeks sampled	26	39	
	Man-hours/week	72	24	
	Total Man-hours	1872	936	
	$/hour	$25	$25	
	Total Labor Cost	$46,800	$23,400	
$70,200				
	Equipment Use, Supplies	$11,700	$5,850	
$17,550				
Laboratory				
Sample Analysis	Total Sample Volume(m3)		34,442	
	$/m3		$1.30	

	Total Sample Cost		$44,800
$44,800			
Data Summary			
Report	Total Man-hours	120	
	$/hour	$100	
	Labor Cost	$12,000	
$12,000			
Total Cost			
$144,550			

This sampling program would describe only the temporal distribution and abundance of fish and shellfish in the vicinity of the intake. It would not provide sufficient information either to estimate fractional reductions in the subject populations or to estimate the dynamics of affected populations.

This same kind of program for freshwater sites would cost between $50,000 and $350,000 depending on the complexities of the site. Most sites would fall near the middle of this range (i.e., $100,000-200,000), again an order of magnitude higher than EPA has estimated.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.068.122

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Terry M. Hogan & David E. Bailey

Organization Utility Water Act Group c/o Hunton & Williams

EPA Has Underestimated the Time Required for the BBC

As already noted, EPA proposes to have all new facilities perform one year of baseline biological sampling, and to have the prospective permittee submit a sampling plan for review by the permitting agency 90 days prior to beginning the sampling. 65 Fed. Reg. 49,096 col. 3. Based on the BBC requirements, EPA provides the following example for NPDES permitting.

Table 6. Example of Schedule for Permit Application Activity

NPDES Permit Application Activity	Days Prior to Commencement of Operation
Submit sampling plan for Source Water Baseline Biological Characterization	635
Begin sampling for Source Water Baseline Biological Characterization	545
Submit permit application	180

This schedule is unrealistic based on the collective permitting experiences of UWAG members. First, development of the sampling plan could reasonably require 2-3 months' effort in assembling site data and information and drafting the report. Second, if the permitting agency requests revisions to the plan (as is often the case for § 316(b) study plans), the prospective site operator will need additional time (perhaps one month) to revise the plan, and then the permitting agency may need several weeks to complete the approval process. Once the sampling plan is approved, the prospective site operator must issue a request for proposals to qualified contractors and review their responses. This process could easily require a month to six weeks.

During implementation of the sampling program, delays due to inclement weather or equipment failure are likely to occur. Also, once the sampling is complete, it is likely that the contractor will need two months to analyze the data and prepare the written report, after which company review and commenting on the report could require another month.

Thus, the length of time for development of the BBC likely will be much longer than EPA estimates, and will significantly delay the NPDES permitting process. The cumulative delays in building new power sources may result in short-term power shortages in some regions. In short, this level of effort cannot be justified and should not be required for facilities that opt to use closed-cycle cooling or other inherently low risk technologies.

EPA Response

See Response to Comment 316bNFR.536.014.

Comment ID 316bNFR.068.123

Author Name	Terry M. Hogan & David E. Bailey
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Subject Matter Code 20.2

Monitoring Requirements

The Proper Frequency and Costs for Post-Operational Monitoring Are Site-Specific

Section 125.87 of the proposed rule (65 Fed. Reg. 49,121 col. 1-2) would impose post-operational monitoring requirements. An owner or operator of a new facility would have to monitor impingement, entrainment, and head loss or velocity and conduct visual inspections of technologies designed to minimize entrainment and maximize impingement survival.

This post-operational monitoring would probably be unnecessary at most sites, if EPA were to finalize the other parts of the proposed rule. The proposed rule as drafted imposes such stringent requirements, and so many of them, that they would prove redundant and make additional measures, such as post-operational monitoring, unnecessary.

Nevertheless, if EPA eventually promulgates a more reasonable rule, such as one along the lines that UWAG has outlined above, some post-operational monitoring may be appropriate at some sites. The kind and extent of such monitoring depends on site characteristics and should be tailored individually to each site.

EPA's proposed rule does provide a modest bit of flexibility by allowing the Director to approve a request for less frequent sampling after the first two years. 65 Fed. Reg. 49,121 col. 1. The monitoring requirement itself is overconservative and too burdensome, but the provision allowing the frequency to be reduced is a good one. The provision for requesting less frequent monitoring and having the request approved, however, is too cumbersome and time-consuming.

It is important when setting monitoring requirements that the monitoring study be intensive enough to provide useful information, yet not so intensive that the program is unnecessarily costly or time-consuming. The sampling frequencies suggested by EPA (once monthly for impingement and biweekly for entrainment during specified periods, per proposed § 125.87) may not, in certain locations, provide enough data for determining whether AEI is occurring, or even for comparing entrainment and impingement levels across years.

In the waterbodies that EPA considers most sensitive, estuaries and tidal rivers, there is a great deal of natural variability due to tidal currents; diel changes in organism behavior; and the effects of temperature, salinity, and freshwater flow on the distribution of aquatic organisms. For any system, and particularly for estuaries and tidal rivers, the minimum program that would be likely to produce useful data would be once a week for both entrainment and impingement monitoring. Thus the EPA estimate of the cost to conduct monitoring of entrainment and impingement is extremely low.

Due to EPA's intention to re-evaluate intake effects during each five-year renewal of the discharge permit (65 Fed. Reg. 49,100 col. 3), it is important for the facility owner to characterize accurately the entrainment and impingement levels and avoid the risk of an erroneous determination that entrainment

and impingement levels have increased and require additional remedies. Therefore, it is likely that the interests of facility owners and EPA as well would be better served by more frequent sampling. A more reasonable estimate would be weekly for impingement and weekly for entrainment during the six warmest months, and biweekly during the rest of the year. Costs for such a sampling program would be four times higher for impingement and 1.5 times higher for entrainment than EPA's cost estimates in Table 6-9 of the EEA. If other costs were assumed not to change, the total program costs would be approximately twice as high as the EPA estimate of $79,245.

Table 7. Comparison of EPA Estimate and Realistic Estimate of Annual Monitoring Costs

	EPA	Realistic
Biological monitoring (impingement)	$17,986	$71,944
Biological monitoring (entrainment)	$38,675	$58,013
Velocity monitoring	$4,269	$4,269
Weekly visual inspections	$6,931	$6,931
Yearly status report activities	$11,384	$11,384
Total	$79,245	$152,541

These sampling programs would be limited to describing the temporal distribution and abundance of entrained and impinged fish and shellfish. No information would be derived on the survival rates of entrained or impinged organisms. Collecting survival information requires sampling with specialized sampling gear and protocols and would impose considerable additional costs.

EPA Response

EPA has revisited and revised the cost estimates for monitoring based on revisions to the final rule, and those costs are documented for the record in the ICR. EPA believes Section 308 and Section 316(b) of the Clean Water provide ample authority for the monitoring provisions of today's rule. At § 125.87, today's final rule requires biological monitoring and visual or remote inspections at all facilities. Track I facilities and Track II facilities that rely on specified velocity levels as part of their alternative technology(ies) are also required to monitor screen head loss and velocity. EPA has considered the costs of such monitoring in the ICR, and does not consider the requirements to be burdensome or expensive.

Both Track I and Track II facilities must conduct biological monitoring for impingement and entrainment to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. In order to prevent extensive and open-ended biological monitoring (which can be burdensome and expensive), today's rule adds that after 2 years the Director may approve an applicant's request for less frequent monitoring. Objectives for post-permit monitoring are to provide supporting data to assure that the technologies are consistently performing as projected under all operating and environmental conditions.

Specific monitoring requirements include:

Impingement Sampling. You must collect samples to monitor impingement rates (simple enumeration)

for each species over a 24-hour period and no less than once per month when the cooling water intake structure is in operation.

Entrainment Sampling. You must collect samples to monitor entrainment rates (simple enumeration) for each species over a 24-hour period and no less than biweekly during the primary period of reproduction, larval recruitment, and peak abundance identified during the

Source Water Baseline Biological Characterization required by 40 CFR 122.21(r)(3) or the Comprehensive Demonstration Study required in § 125.86(c)(2). You must collect samples only when the cooling water intake structure is in operation.

Velocity Monitoring. If your facility uses intake screen systems, you must monitor head loss across the screens and correlate the measured value with the design intake velocity. The head loss across the intake screen must be measured at the minimum ambient source water surface elevation (best professional judgment based on available hydrological data). The maximum head loss across the screen for each cooling water intake structure must be used to determine compliance with the velocity requirement in § 125.84(b)(2). If your facility uses devices other than intake screens, you must monitor velocity at the point of entry through the device. You must monitor head loss or velocity during initial facility startup, and thereafter, at the frequency specified in your NPDES permit, but no less than once per quarter.

Visual or Remote Inspections. You must either conduct visual inspections or employ remote monitoring devices during the period the cooling water intake structure is in operation. You must conduct visual inspections at least weekly to ensure that any design and construction technologies required in § 125.84(b)(4) and other technologies to minimize entrainment and maximize impingement survival are maintained and operated to ensure that they will continue to function as designed. Alternatively, you must inspect via remote monitoring devices to ensure that the impingement and entrainment technologies are functioning as designed.

Comment ID 316bNFR.068.124

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Subject Matter Code 16.1

Discretionary Options Available to the Director

SOME OF EPA'S SUGGESTED ALTERNATIVES FOR IMPLEMENTING § 316(b) HAVE DESIRABLE FEATURES; OTHERS DO NOT

In addition to the proposed rule, EPA has requested comments on a number of alternative ways to implement § 316(b). These include a "wholly disproportionate" test that would apply to costs versus benefits (as distinguished from the EPA-costs-versus-permittee-costs test in the proposed rule), a "rebuttable presumption," site-specific approaches, and several others.

UWAG supports some of the features of these alternatives, as explained below. As a general matter, we agree with alternative approaches that are consistent with the decision principles in Appendix E to these comments. {attached}

EPA Response

Today's final rule includes the opportunity for a permit applicant to request alternative requirements that are no less stringent than justified by the wholly out of proportion cost, and the alternative requirements will ensure compliance with other applicable provisions of the Clean Water Act and any applicable requirements of state law. See section VII.H of the preamble to the final rule and response to comment 316bNFR.027.020.

Comment ID 316bNFR.068.125

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Subject Matter Code 16.1

Discretionary Options Available to the Director

The "Wholly Disproportionate" Test

EPA has asked for comment on an additional basis for establishing alternative, less stringent requirements, namely that the costs of compliance would be "wholly disproportionate" to projected environmental benefits. 65 Fed. Reg. 49,092 col. 1. This wholly disproportionate cost test would be provided either instead of, or in addition to, the cost test proposed as part of § 125.85(a), namely costs wholly out of proportion to the costs EPA considered in the rule development. Id.

The "wholly disproportionate" test cannot be reconciled with the statute's requirement that the "best" of available CWIS technologies be selected or that it should be adopted as a national cost/benefit standard. Both Congress, in laws such as the Unfunded Mandates Reform Act<FN 97>, and the Executive Branch<FN 98>, in several administrations, have directed federal agencies to maximize the net benefits of regulatory actions and to reduce burdens on the private sector. The "wholly disproportionate" test, especially if applied nationwide, would not do this.

A statement by the spokesman for the House Conferees indicates that Congress intended the "best technology available" to be interpreted to mean the "best technology available commercially at an economically practicable cost." 118 Cong. Rec. H 9130 (daily ed. Oct. 4, 1972) (remarks of Congressman Clausen). In related contexts, Congress has said that the term "available" implies that consideration of economic factors is required. S. Rep. No. 92-414, 92d Cong., 1st Sess. 58 (1971).

Apart from the statutory language itself, subsequent federal requirements impose upon EPA the necessity to weigh, evaluate and determine the economic benefits and attributes that would result from regulatory policies. Executive Order 12866, issued September 30, 1993, requires that "[e]ach agency shall assess both the cost and the benefits of the intended regulation and . . . propose a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs." The Executive Order further states that "[e]ach agency shall base its decisions on the best reasonably obtainable scientific, technical, economical, and other information concerning the need for, and consequences of, the intended regulation." An agency is also required to "tailor its regulations to impose the least burden."

We are aware that almost 20 years ago, long before the emergence of resource economics as applied to environmental issues and long before Executive Order 12866 or the Paperwork Reduction Act, certain EPA decisions suggested that Clean Water Act control technologies should be viewed as acceptable so long as the control costs were not "wholly disproportionate" to the environmental benefits. While even this standard appropriately requires consideration of control cost economics, those references in the legislative history of the Clean Water Act to the weighing standard of the "wholly disproportionate" test are set forth only in the context of "effluent reduction benefits" and not non-effluent intake structure control programs under § 316(b). The legislative history specifically with respect to § 316(b) does indicate that "'best technology available' is intended to be interpreted to

mean the best technology available commercially at an economically practicable cost." See 1 "A Legislative History of the Water Pollution Control Act Amendments of 1972" at 170, 264.

Later developments, such as Executive Order 12866, the Unfunded Mandates Reform Act of 1995, the Paperwork Reduction Act, and the Small Business Regulatory Enforcement Fairness Act of 1996, provide cumulative support for a more rigorous and balanced comparison of costs and benefits. Case law in related areas, such as the § 404 context, also provide a basis for alternative tests, such as the "reasonably proportional" test employed in "Dolan v. City of Tigard", 512 U.S. 374 (1994), and "Lucas v. South Carolina Coastal Council", 505 U.S. 1003 (1992).

For the overall greatest benefit to society, the best approach to evaluating BTA candidates would be to consider only alternatives that have the potential to maximize net benefits to society. The test should be to choose the technology that maximizes net benefits to society. Section 316(b) requires that the costs of BTA alternatives bear a reasonable relationship to the benefits and that "costs" and "benefits" be viewed comprehensively, and in the context of other man-induced influences on aquatic populations.

The argument that costs of all sorts should be considered in government decisionmaking and that cost-benefit analysis is a useful tool for that purpose was put eloquently in a recent amicus brief to the Supreme Court by a number of eminent economists, including three Nobel laureates:

The importance of this issue cannot be overstated. Both the direct benefits and costs of environmental, health, and safety regulations are substantial – estimated to be several hundred billion dollars annually. If these resources were better allocated with the objective of reducing human health risk, scholars have predicted that tens of thousands more lives could be saved each year. All presidents since Nixon – both Democratic and Republican – have attempted to make environmental, health, and safety regulations more efficient by requiring some form of oversight attempting to balance benefits and costs. President Reagan and President Clinton each crafted an executive order that required an explicit balancing of benefits and costs for major regulations to the extent permitted by law.

Brief Amici Curiae of AEI-Brookings Joint Center for Regulatory Studies et al. in American Trucking Ass'ns v. Browner, No. 99-1426 (U.S.) at 1-2 (July 21, 2000) (footnote omitted). This brief is attached as Appendix G to these comments.

The White House, Congress, and the courts increasingly recognize the importance of balancing costs and benefits. This trend was summarized in the amicus brief:

To address the increase in regulatory activity over the past three decades, the past five presidents and President Clinton have introduced different analytical requirements and oversight mechanisms with varying degrees of success. A central component of later oversight mechanisms was formal economic analysis, which included benefit-cost analysis and cost effectiveness analysis. Since 1981, presidents have required the preparation of RIAs for a predefined class of significant regulations. President Reagan's Executive Order 12291 required an RIA for each significant regulation whose annual impact on the economy was estimated to exceed $100 million. President Bush used the same executive order. President Clinton's and President Reagan's executive orders require a benefit-cost analysis for significant regulations as well as an assessment of reasonably feasible alternatives to the

planned regulation.

Congress has also shown increasing interest in emphasizing the balancing of benefits and costs in regulatory decisions. The Small Business Regulatory Enforcement Fairness Act of 1996 requires agencies to submit final regulations to Congress for review. The regulatory accountability provisions of 1996, 1997, and 1998 require the Office of Management and Budget to assess the benefits and costs of existing federal regulatory programs and to recommend programs or specific regulations to reform or eliminate. The Unfunded Mandates Reform Act of 1995 requires agencies, unless prohibited by law, to choose the most cost-effective regulatory approach or otherwise explain why they have not chosen this alternative.

The courts have also been receptive to the use of benefit-cost analysis in decisionmaking. Indeed, the D.C. Circuit recently held in State of Michigan v. EPA, 2000 WL 180650, at *12 (D.C. Cir. 2000), that "[i]t is only where there is 'clear congressional intent to preclude consideration of cost' that we find agencies barred from considering costs." The court went on to cite various cases and legal authorities for the "general view that preclusion of cost consideration requires a rather specific congressional direction." Id. This case and others led Professors Robert H. Frank and Cass R. Sunstein to conclude that "[f]ederal law now reflects a kind of default principle: Agencies will consider costs, and thus undertake cost-benefit analysis, if Congress has not unambiguously said that they cannot."

Id. at 6-8 (footnotes omitted).

The wholly disproportionate test would require CWIS technologies even if the economic costs quite outweighed the benefits to the environment, so long as the imbalance was not "wholly disproportionate." This would not only permit but affirmatively require a persistent overuse of mitigative measures. It would be inconsistent with the Congressional mandates and Executive Order referred to above, and also incompatible with the requirement of § 316(b) that the "best" CWIS technology be selected. As stated elsewhere in these comments, the best CWIS option (or suite of options) is the one that maximizes the net benefits. What technology does this can be determined only on a site-specific basis.

Footnotes

97 2 U.S.C. § 1501 et seq.; see also Small Business Regulatory Fairness Act, 5 U.S.C. § 601 note.

98 See Executive Order 12866 §§ 1.a, 1.b(5), (6), (7).

EPA Response

For an explanation of why EPA did not choose a cost/benefit test instead of the "wholly out of proportion" test for the variance requirement, see response to comment 316bNFR.027.020. For a discussion of why EPA found it reasonable to interpret 316(b) as authorizing a technology-based approach, see the preamble to the final rule and responses to comment 316bNFR.068.007 and 068.008. For additional discussion of the reason EPA chose the cost to revenue approach or economic achievability approach to considering costs in this rule, see 3168NFR 206.014.
For a discussion of EPA's compliance with UMRA and E.O. 12866, see the preamble to the final rule and elsewhere in this comment response document. The requirements of the E.O. do not modify

existing domestic law or create private rights of action.
Today's final rule includes the opportunity for a permit applicant to request alternative requirements that are no less stringent than justified by the wholly out of proportion cost, and the alternative requirements will ensure compliance with other applicable provisions of the Clean Water Act and any applicable requirements of state law. See preamble section VII.H for discussions on EPA's wholly out of proportion test. For more information on EPA's economic analysis and what types of facilities EPA evaluated, see preamble section VIII and the accompanying support document entitled: Economic Analysis of the Final Regulations Addressing Cooling Water Intake Structures for New Facilities.

Comment ID 316bNFR.068.126

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Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

Rebuttable Presumption

One alternative EPA is considering is to establish a "rebuttable presumption" that the requirements of the proposed rule (or some other uniform national requirement) reflect BTA. Under this approach, a new facility would have the option of demonstrating that, due to site-specific conditions, some alternative technology or suite of technologies would minimize AEI. 65 Fed. Reg. 49,080 col. 1.

Although UWAG agrees that permit applicants should have a choice in how to satisfy § 316(b), a "rebuttable presumption" is not the way to produce it. UWAG believes that EPA may not use the legal mechanism of the "rebuttable presumption" where, as here, it has not first built the factual record necessary to show that the standards it proposes in fact reflect the "best technology available for minimizing adverse environmental impact." As a matter of law, a rebuttable presumption shifts the burden of proof to the one who seeks to avoid the presumption. See Black's Law Dictionary (6th ed. 1990); Heiner v. Donnan, 285 U.S. 312, 329 (1932). Here EPA has not established a factual record sufficient to support its standards. Thus EPA has no adequate factual basis for establishing the proposed standards as presumptively applicable "BTA."

For the same reason, UWAG cannot support the alternative "rebuttable presumption" approach suggested at 65 Fed. Reg. 49,080 col. 2-3, which would apparently allow permittees to use a wider range of factors (such as the absence of AEI, disproportionate costs vs. benefits, technological infeasibility, or the use of restoration or mitigation alternatives) to rebut the presumption.

EPA Response

See responses to comments 316bNFR.009.004 and 316bNFR.068.001.

Comment ID 316bNFR.068.127

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Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

Site-specific Option

Another approach EPA says it is considering would apparently impose technology requirements like the proposed rule but allow facilities the option of performing studies for a site-specific BTA determination. 65 Fed. Reg. 49,083 col. 1.

UWAG agrees that § 316(b) implementation should be site-specific; that a tiered site-specific study approach like the one described earlier in these comments is well-supported technically and consistent with longstanding practice; that permittees should have the option of pursuing site-specific studies or simply adopting a preapproved CWIS technology that presents little or no risk of AEI; that such an approach would be efficient, cost-effective, and not unduly burdensome for either regulators or the regulated community; and that it would avoid the duplication and waste inherent in EPA's proposed standards. The approach we describe in Part VI.A.5 above reflects these same principles.

But to the extent that the approach EPA describes is subsidiary to a rebuttable presumption, we do not believe it can be justified. A rebuttable presumption would be just as wrong for this alternative, and for the same reasons, as for the previous one.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. Thus, the final rule allows flexibility for consideration of site specific factors. Also see response to 316bNFR.009.004 (rebuttable presumption).

Comment ID 316bNFR.068.128

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Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Site-specific Approaches

EPA also is considering two site-specific approaches. One it describes as a site-specific approach resembling the framework EPA proposed in the 1970s, but which would include specific decision criteria. 65 Fed. Reg. 49,080 col. 1. Under this approach, EPA says, it would determine whether AEI is or is not occurring. If AEI is occurring, EPA then would consider a number of factors in determining BTA. The Agency then describes the regulatory language it would use to implement this approach.<FN 99> That language appears to focus primarily on the factors EPA would consider in evaluating the significance of the impact of the proposed discharge, rather than the selection of "BTA" to minimize that impact. UWAG does not believe that the concept EPA has articulated provides sufficient information to allow us to comment fully on it.

Footnotes

99 The Director must determine whether a cooling water intake structure is minimizing adverse environmental impact based on the consideration of:
(1) The composition and vulnerability of the biological communities within the cooling water intake structure's zone of influence;
(2) The importance of the source waterbody to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, and areas necessary for critical stages in the life cycle of aquatic organisms;
(3) Potential impingement of aquatic organisms based on the design intake velocity;
(4) Potential entrainment of small aquatic organisms based on the intake water flow;
(5) Existing or potential recreational, commercial, and subsistence fishing, including finfishing and shellfishing;
(6) Other factors relating to the adverse environmental impact of the intake, as may be appropriate.
65 Fed. Reg. 49,080 col. 1.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.068.129

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Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

The second option EPA describes is a site-specific, tiered approach, of the type UWAG has advocated for some time. 65 Fed. Reg. 49,082. For the reasons given elsewhere in these comments, UWAG recommends this approach, although with an alternative option of installing pre-approved technology to allow speedy decisionmaking. As UWAG has argued in these comments, such an approach would be consistent with the statute, protective of the environment, efficient, and cost-effective.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This approach is similar to that recommended by the commenter. See response to 316bNFR.008.001.

Comment ID 316bNFR.068.130

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Subject Matter Code 10.12

Request for Comment: Best Technology Available Requirement "Trading"

Tradeoffs Within a Facility

EPA has considered an alternative under which facility operators would have the flexibility to "trade" among components of BTA to get equivalent reductions in AEI at lower costs. 65 Fed. Reg. 49,081-82. An operator could reduce flow more than required, for example, in return for not having to reduce velocity as much as specified, or to install fewer additional design technologies. 65 Fed. Reg. 49,082 col. 1. UWAG believes that such trade-offs are worthy of consideration but that this kind of analysis is best performed by means of a site-specific § 316(b) determination process.

EPA Response

See response to 316bNFR.008.009.

Comment ID 316bNFR.068.131

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Subject Matter Code 16.5

Request for Comment: Use of Innovative Technologies

Alternative Limits to Facilitate Innovative Practices

EPA also is considering a variance alternative to allow innovative CWIS design and operation. 65 Fed. Reg. 49,092 col. 3. As examples, EPA mentions artificial filter beds, radial wells, porous dikes, and perforated pipes. Id. This alternative would replace the requirements of the proposed rule with facility-specific requirements so long as the innovative technology reduced impingement and entrainment to a level commensurate with the rule and had the potential for industrywide operation. 65 Fed. Reg. 49,093 col. 1.

UWAG agrees that any rule EPA issues should encourage innovation, not discourage it as EPA's minimum standards would do. See Appendix E. Again, though, we believe that a site-specific approach would both encourage and accommodate innovation far better than EPA's proposed minimum standards.

EPA Response

See response to comment 316bNFR.008.014 and the preamble to the final rule.

Comment ID 316bNFR.068.132

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Subject Matter Code 10.13

Request for Comment: Uniform Set of Standards Applicable to All Facilities

Highest Requirements for All Facilities

EPA says it is considering applying the proposed rule for estuaries to all facilities regardless of location. 65 Fed. Reg. 49,082 col. 1. The principal rationale for this alternative is apparently a desire for uniformity. For all the reasons demonstrated in previous sections, we do not believe a one-size-fits-all approach is warranted.

EPA Response

EPA set technology-based performance requirements for the final rule based on the performance of a suite of technologies and a flexible, two-track, compliance framework. As such, EPA has not required installation of a single technology through this rule.

EPA disagrees with the implication in the comment that dry cooling towers are hardly an alternative. Although EPA has rejected dry cooling technology (see Section V.C of the preamble to the final rule) as a national requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). See response to comment 074.009.

Regarding EPA's legal authority to regulate the capacity of cooling towers see response to comment 316bNFR.068.010 and 316bNFR.068.011.

Comment ID 316bNFR.068.133

Author Name	Terry M. Hogan & David E. Bailey
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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Dry Cooling

Although there is no legal authority to require it, one “technology” (though not an intake structure technology) that EPA is considering is the dry cooling tower. As explained elsewhere in these comments and in Appendix F, dry cooling towers are hardly an “alternative” at all, or at best an unattractive one, for most sites. First, they are very expensive, more costly even than wet cooling towers. Second, they require more energy than other cooling methods and therefore exact a large energy penalty from generating stations where they are used. This penalty also includes the burning of more fossil fuels, with the environmental costs that entails.

EPA Response

EPA set technology-based performance requirements for the final rule based on the performance of a suite of technologies and a flexible, two-track, compliance framework. As such, EPA has not required installation of a single technology through this rule.

EPA disagrees with the implication in the comment that dry cooling towers are hardly an alternative. Although EPA has rejected dry cooling technology (see Section V.C of the preamble to the final rule) as a national requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). See response to comment 074.009.

Regarding EPA's legal authority to regulate the capacity of cooling towers see response to comment 316bNFR.068.010 and 316bNFR.068.011.

Comment ID 316bNFR.068.134

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Subject Matter Code 15.1

Request for Comment: Role of Restoration

EPA ALTERNATIVES FOR SETTING MORE STRINGENT LIMITS ARE UNAUTHORIZED
Restoration Measures Have a Role but Cannot Be Required
Voluntary Restoration Measures Should Be Considered for § 316(b) Purposes

EPA is considering a variety of mandatory, discretionary, and voluntary regulatory approaches involving restoration measures. 65 Fed. Reg. 49,089 col. 3. Restoration measures include creating or improving wetlands, operating fish hatcheries or stocking programs, and removing impediments to fish migration. 65 Fed. Reg. 49,089 col. 2.

UWAG agrees that restoration has potential application to § 316(b), albeit not as the mandatory requirements EPA has suggested. Such activities might include, but not be limited to, fish hatcheries and stocking, wetlands restoration or creation and other types of habitat improvement, removal of barriers to fish migration, creation of artificial reefs, and installation of fish ladders. On a site-specific basis, such measures have more potential to achieve net environmental benefits for the waterbody than most CWIS technologies.

Instead of setting a requirement, the rule should allow permitting agencies to consider any proposed environmental enhancement that offers a reasonable means of providing material benefits to important species. What UWAG calls "environmental enhancements" should be considered at two points in the § 316(b) process. First, in assessing whether a CWIS is causing AEI, the regulator should net the estimated environmental costs associated with the CWIS against the estimated benefits from any environmental enhancements to be operated or financed by the facility. In this way, an evaluation of possible environmental enhancements helps to define whether AEI is likely to occur, which is the initial § 316(b) inquiry.

Second, assuming the regulator has determined that the CWIS is causing, or is reasonably likely to cause, AEI, the facility should be allowed to propose environmental enhancements to offset the AEI attributable to the CWIS in lieu of installing CWIS technologies. The regulator then can weigh the potential benefits of the proffered enhancement against the benefits to be expected from changes to the CWIS. UWAG believes that environmental enhancements may, in some cases, offer the best alternative for all interested stakeholders by maximizing benefits to the environment in a cost-effective manner.

Some people have argued that the language of § 316(b) forbids consideration of environmental enhancements in place of CWIS technological modifications. UWAG agrees that environmental enhancements are not "intake structure technologies" and thus that § 316(b) does not authorize regulators to require them. However, § 316(b) does require the regulator to determine, in the first instance, whether AEI is occurring. Because existing enhancements directly affect the AEI determination, they enter the § 316(b) determination process well before the regulator reaches the question of what CWIS technologies are the "best available" for minimizing AEI. Thus, whether

existing environmental enhancements are or are not CWIS technologies is irrelevant to the AEI inquiry.

As for proposed environmental enhancements offered during the BTA assessment phase of § 316(b), EPA has considered and accepted prospective environmental enhancements in several § 316(b) permitting decisions. See, e.g., In the Matter of Florida Power Corp., Crystal River Power Plant, Units 1, 2, and 3 Findings and Determinations, NPDES Permit No. FL0000159 (Sept. 1, 1988) (authorizing a fish hatchery program "in an attempt to replace fish and shellfish eggs, larvae, and juveniles entrained" by the facility); Fact Sheet for John Sevier Decision (Application No. TN0005436) Region IV (1986) (finding fish stocking and monitoring program were "appropriate measures for compliance with Section 316(b)").

There is no principled reason to change this approach in the new § 316(b) rules, and there are good policy reasons to allow regulators the flexibility to evaluate environmental enhancements that will minimize AEI, even ones that are not CWIS technological fixes. Where a permittee's operation of a CWIS causes effects that otherwise would constitute AEI and those effects can either be eliminated or significantly offset by environmental enhancements that benefit not only the species of interest but also the environmental community as a whole (such as wetlands restoration, fish ladders, and aquaculture activities), it makes little sense to automatically require installation of the technology instead. This is especially true where the cost of CWIS technology upgrades (together with other relevant factors such as the remaining useful life of the facility) weigh against requiring an investment in technology. Furthermore, in situations where there is disagreement over whether AEI is occurring at all, if the permit applicant is prepared to propose an enhancement project, both the applicant and the regulator may avoid lengthy and expensive litigation and at the same time secure a long-term benefit to the potentially impacted aquatic community.

As an important first step, the scope and nature of the agreed-to environmental enhancement should be documented in the permit or other binding document. Schedules of implementation and any appropriate monitoring plans could also be documented. Because of the many possible types of enhancements and the varied ways they may interact with the environment, EPA should avoid attempting to define the monitoring measures or other types of demonstrations that may apply to evaluation of § 316(b) determinations. Instead, EPA should propose that each enhancement be subject to some form of evaluation – leaving it to the regulator to decide, based on his best professional judgment, what constitutes an acceptable demonstration of the enhancement's efficacy.

In UWAG's view, the scope of the evaluation of the enhancement should be largely dependent on the degree of uncertainty surrounding the project. An enhancement that involves an experimental technique or is unproven in a certain environmental setting should be subject to more rigorous evaluation than an enhancement that is routinely implemented (e.g., fish stocking). In any case, however, the scope of the evaluation should be scientifically reasonable and should not impose an unreasonable burden of proof.

EPA Response

See response to comment 316bNFR.024.007.

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Subject Matter Code 15.11

Mandatory Approaches

Section 316(b) Does Not Authorize Mandatory Restoration

Although the proposed rule does not require mandatory restoration projects in waters EPA deems "more sensitive" or "most sensitive," EPA has asked for comment on such a requirement. UWAG's comment is that § 316(b) of the Clean Water Act gives EPA no statutory authority to require restoration.

EPA may believe that restoration measures can be required as part of intake structure "design," according to EPA's own interpretation of that statutory term. EPA may also believe that the courts would defer to this interpretation as the United States Supreme Court did in Chevron v. NRDC, 467 U.S. 837 (1984).

The Chevron decision prescribes how courts should review an Agency's interpretation of a statute it is charged with administering. In Chevron, the rule in question defined the term "source," for purposes of new source review under the Clean Air Act, to include an entire facility, rather than each stack or activity within a facility. The U.S. Court of Appeals for the D.C. Circuit found that the statutory language and legislative history did not indicate conclusively what Congress meant by "source" but struck down EPA's rule on the ground that EPA was changing prior policy without documenting the impact of such a change on air quality. The Supreme Court reversed, finding that Congress had not spoken directly to the issue in question and that EPA's rules reflected a permissible construction of the statute.

The Chevron case does not justify mandatory restoration under § 316(b) for the following reasons. First, an interpretation authorizing mandatory restoration would be inconsistent with the plain language of the statute. Section 316(b) gives EPA specific and limited authority to require that the "location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." While restoration projects may involve some "design," it is not the design "of cooling water intake structures," as the statute requires, nor is any "technology" associated with such requirements reflected in the design of the structure. Rather, the restoration projects that we understand EPA has in mind would involve projects done on and for the benefit of a waterbody or some other environmental medium. They would not involve technologies applied on or to the CWIS.

Nor can EPA credibly claim that it is free to define "cooling water intake structure" to include attributes of the waterbody that are wholly unrelated to any structure by which cooling water enters a facility. As noted elsewhere in these comments, EPA's General Counsel has put forth some guidance on the meaning of "cooling water intake structure."

For example, in General Counsel Opinion No. 41, EPA distinguished CWISs from cooling systems, showing that it recognized that intake structures have limits. It would not be credible to interpret the

term “intake structure” to give EPA authority to impose requirements that permittees design restoration projects for the general benefit of a waterbody or other environmental medium. See, e.g., Walton v. Hammons, 192 F.3d 590 (6th Cir. 1999) (agency may not ignore traditional tools of statutory language or resolve any apparent statutory ambiguity).

The fact that the Clean Water Act does not specifically prohibit EPA from imposing restoration also does not justify EPA’s action. Nothing in the Chevron decision suggests that an agency may create any requirement that it thinks is a good idea and that Congress has not had the foresight to prohibit. Rather, a rule must reflect a permissible construction of the statute under which Congress has granted the agency authority to act. The specific authority Congress has given EPA is to set technological requirements for the location, design, construction and capacity of cooling water intake structures, as necessary to minimize adverse environmental impact. Even if the specific terms are open to some interpretation, nothing authorizes EPA to go beyond the basic jurisdictional grant – i.e., establishment of technological controls for cooling water intake structures. And, as noted above, there simply is no credible way to stretch the term “cooling water intake structure” to cover a whole waterbody (much less other environmental media, which EPA also has talked about as candidates for “environmental restoration”). See e.g., Lopez-Flores v. Resolution Trust Corp., 93 F. Supp. 834 (E.D. Mich. 2000) (gap-filling activities may increase depth of the penetration of a statute into the affairs that were intended to be regulated, but they may not expand scope of agency’s authority into the external universe of topics that Congress neglected or purposefully omitted).

EPA Response

EPA has not mandated restoration, but has authorized it under Track II. EPA disagrees with the commenter that the word design does not contemplate restoration measures or a "technology" as that word is used in section 316(b). See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II. See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II.

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Subject Matter Code 16.1

Discretionary Options Available to the Director

Section 316(b) Does Not Authorize EPA To Set A Rule Requiring States To Set Additional CWIS Limits For Attaining Water Quality Standards

In proposed § 125.84(g), EPA proposes that the Director must include more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure if necessary to ensure attainment of water quality standards, including designated uses, criteria, and antidegradation requirements. 65 Fed. Reg. 49,091 col. 2. This proposal is not consistent with § 316(b) or any other section of the Clean Water Act, nor does it have any precedent in EPA rules or interpretations.

Section 316(b) is a narrowly drafted provision, unique in the Clean Water Act, that requires the application of certain technologies that qualify as the "best available" and are relevant to specific attributes of a CWIS, where necessary to minimize AEI. EPA does not cite § 316(b) as authority for its proposal; instead, it cites § 301(b)(1)(C) of the Clean Water Act, 33 U.S.C. § 1311(b)(1)(C). See 65 Fed. Reg. 49,091 col. 2. But that section of the Act falls within a section that applies to "discharges of pollutants" (see § 301(a)). Section 301(b)(1)(C) simply requires (in relevant part) that these discharges achieve, by the date specified, "any more stringent limitation [more stringent than other technology-based limits required by § 301, which does not include or refer to § 316(b)], including those necessary to meet water quality standards. . . ." In context, it is clear that § 301(b)(1)(C) authorizes only additional limits, beyond otherwise applicable technology-based effluent limits, on point source discharges – not CWISs.

Furthermore, all limits, including ones imposed pursuant to § 301(b)(1)(C), must be applied through the NPDES permit program under Clean Water Act § 402, 33 U.S.C. § 1342. The NPDES permit program applies only to point source discharges – not to intake structures of any kind. While § 402 authorizes permits that require compliance with both § 301 and § 316 (§ 402(b)(1)(A)), nowhere does it suggest that Congress intended to give EPA or states authority to impose additional limits on intake structures based on water quality. CWISs directly affect aquatic organisms, not water quality. The emphasis that § 402 places on discharges of pollutants, and limits on those discharges – with the sole exception of its one reference to § 316 – shows that this was not Congress' intent. In an analogous context, the United States Court of Appeals for the District of Columbia Circuit agreed, saying that § 402 allows EPA to impose limits on discharges to protect only water quality – not other attributes of the facility. See Natural Resources Defense Council v. EPA, 859 F.2d 156, 169-71 (D.C. Cir. 1988). <FN 100>

Further evidence of this is found in the water quality standards themselves. They consist of designated uses and numeric or narrative "criteria" for pollutants<FN 101>, which reflect state or federal judgments, adopted by rule, about what levels of pollutants will protect the designated uses.<FN 102> See 40 C.F.R. § 131.3(b) (1999) (criteria are elements of state water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing the

quality of water that supports a particular use (emphasis added)).

Although we understand that EPA has begun to encourage the states to adopt "biocriteria" that attempt to measure, based on biological indices, the health of a waterbody, EPA has no rule requiring such criteria. Nor should it, given that such criteria have not been widely validated for many waterbody types and may not be feasible for some types of waterbody. In short, the standards to which § 301(b)(1)(C) refers are not well adapted for precise interpretation with respect to § 316(b)-related effects. EPA should not invite state reinterpretation of water quality standards.

Finally, such a rule is simply unnecessary to achieve an appropriate level of protection. In adopting § 316(b), Congress recognized that it was important to protect aquatic populations and communities from over-cropping but that technological availability and cost also are relevant. This is the same sort of analysis a state can and should make when it sets water quality standards, which Congress said should take into account attainability. See Clean Water Act § 303(c)(2)(B), 33 U.S.C. § 1333(c)(2)(B) (states shall set standards that include the highest uses whenever attainable, after considering the use and value of waters for various uses, including industrial use). As we point out above, § 316(b) allows both a better-calibrated, site-specific assessment of whether CWIS effects will cause "adverse" environmental effects and a more accurate assessment of what level of minimization is attainable than a water quality standard ever could.

Footnotes

100 As the NRDC Court stated:

> EPA can properly take only those actions authorized by the CWA – allowing, prohibiting, or conditioning the pollutant discharge. And, contrary to EPA's assumption, the CWA does not empower the agency to regulate point sources themselves; rather, EPA's jurisdiction under the operative statute is limited to regulating the discharge of pollutants. Thus, . . . the agency is powerless to impose permit conditions unrelated to the discharge itself. . . . EPA may not, . . . under the guise of carrying out its responsibilities under NEPA, transmogrify its obligation to regulate discharges into a mandate to regulate the plants or facilities themselves. To do so would unjustifiably expand the agency's authority beyond its proper perimeters.

Id. at 169-70.

101 EPA has also said that "antidegradation" provisions are enforceable components of the standards. But, under EPA's water quality standards regulations, those provisions too apply only to water quality and effects on water quality, not to intake effects. See 40 C.F.R. § 131.12 (1999).

102 In other contexts, EPA has suggested that state and federal permit writers should "interpret" their designated uses or narrative criteria on an ad hoc basis, whenever they are concerned about a pollutant for which the state has not adopted a criterion. See 40 C.F.R. § 122.44(d)(1999). While the United States Court of Appeals of the D.C. Circuit upheld this rule in a challenge brought by industry, it also clarified that any ad hoc interpretation proposed in a permit must be justified by an adequate record and remain subject to challenge. See American Paper Institute v. EPA, 996 F.2d 346 (D.C. Cir. 1993). In any case, this rule, which until now has been EPA's only regulation governing when and how water quality-based limits may be established, speaks only to the establishment of limits on pollutant discharges, not intake structures. EPA may not reinvent its interpretation of the water quality provisions of the statute without a good reason, which it does not have in this case.

EPA Response

EPA modified the requirements in the final rule from that which was proposed in order to provide for more certainty in Track 1 in order to expedite permitting and to reflect the policy decision that the

Track 1 requirements represent an appropriate set of controls that reflect best technology available for minimizing adverse environmental impact. EPA agrees that under section 510 of the CWA, states may always require more stringent controls. See preamble sections II and V for a discussion of EPA's authority and basis for this provision. For a discussion of why EPA believes it is reasonable to interpret section 316(b) to authorize a technology-based approach see the preamble and response to comments 316bNFR.068.007 and 068.008.

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Subject Matter Code 16.1

Discretionary Options Available to the Director

EPA's Other Proposals for More Stringent Site-Specific Limits Are Inconsistent with § 316(b)

EPA's proposed rule would also authorize the Director to include more stringent requirements in a permit if reasonably necessary to minimize impingement and entrainment as a result of multiple CWISs in the same body of water, seasonal variations in the aquatic environment, or regionally important species. Proposed 40 C.F.R. § 125.84(f), 65 Fed. Reg. 49,119 col. 1.

In particular, EPA intends that permitting authorities be authorized to impose seasonal flow restrictions that might result in short-term plant shutdowns during spawning or migration periods. 65 Fed. Reg. 49,079 col. 1. But authorizing (or requiring, as EPA suggests in the alternative)<FN 103> states to set limitations on power generation far exceeds both EPA and state jurisdiction under the Act. Congress simply did not give EPA or the states authority to require plant shutdowns, even if "only" on a seasonal basis. Such a limit would not be based on any type of technology, but instead would be direct regulation of the capacity not of the intake structure, but the plant. EPA has cited no authority giving it or the states this power, and there is none. Surely if Congress had intended that result it would have said so in clear terms, given the extraordinary effects on energy availability and reliability and the likely economic and social impacts.<FN 104>

With respect to the other two bases for setting more stringent limits, UWAG suggests that such mechanisms would be unnecessary, and that limits imposed in some cases might be different and less onerous overall, if EPA were to develop and adopt a site-specific decision framework. This could be accompanied by a fast-track option, in which EPA would endorse certain inherently low-risk technologies, which permittees could decide to install in order to expedite permitting and minimize or eliminate baseline study requirements.

Footnotes

103 See 65 Fed. Reg. 49,091 col. 2.

104 This is not to say that a facility could not decide to reduce capacity or shut down during a given season but neither EPA nor the states have any authority to mandate that result under the Clean Water Act.

EPA Response

EPA modified the requirements in the final rule from that which was proposed in order to provide for more certainty in Track 1 in order to expedite permitting and to reflect the policy decision that the Track 1 requirements represent an appropriate set of controls that reflect best technology available for minimizing adverse environmental impact. EPA agrees that under section 510 of the CWA, states may always require more stringent controls. EPA agrees with the commenter's suggestion of a fast-track option. Today's final rule establishes technology-based performance requirements, based on a two-track approach that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I is expeditious and streamlined and provides

certainty of the permit applicant while at the same time requiring the best technology available for minimizing adverse environmental impact of a cooling water intake structure without delayed pre-operational monitoring requirements.

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Subject Matter Code 10.04

Site-specific Permit Flexibility

UWAG's Economic Analysis Concludes that BTA Determinations Should Be Based on Incremental Costs and Benefits

UWAG's economic consultants have reviewed the proposed rule and the EEA that underpins it. Their conclusions, as reported in Appendix E to these comments, are as follows:

Regulatory Alternatives
The Regulatory Approach Should Allow Site-Specific Comparisons

EPA has proposed a major shift in the approach to establishing § 316(b) determinations. Rather than provide § 316(b) determinations on a site-specific basis, the proposed rule would require national minimum technology-based requirements.

The national technology minimum approach largely ignores the substantial variability in the costs and benefits of adopting specific technologies at different locations. Although the proposal would provide some variability in control requirements, the requirements would be uniform for large categories of potential locations. This approach does not appropriately consider costs and benefits when determining which technology to install at specific locations.

Appendix E concludes that allowing § 316(b) determinations to be made on the basis of site-specific evaluations would produce more desirable results in three principal respects:

1. First, the site-specific approach would produce greater fish protection and other environmental benefits for a given level of costs.

2. Second, the site-specific approach would impose lower costs to achieve a given level of fish protection and other environmental benefits.

3. Third, the site-specific approach would provide appropriate incentives for new facilities to locate outside environmentally sensitive areas.

EPA Response

EPA adopted a minimum national technology based standard approach with a two-track Option. The goal is to provide flexibility and ease of permitting where the applicant meets requirements that represent Best Technology Available for minimizing adverse environmental impact, while also giving the option of evaluation and use of alternative technologies that will meet the same reduction of entrainment and impingement. EPA believes that despite varying benefits at different locations, the requirements of this rule for new facilities are well demonstrated, economically practicable, and result

in acceptable no-water quality environmental impacts. The large percentage of new facilities planning to meet the requirements supports this determination. Therefore, EPA does not believe that it is reasonable to engage in lengthy permit negotiations for the vast majority of new facilities.

The cost advantage of the national minimum technology based requirement is that the site investigation costs are substantially reduced, as is the time required for baseline source water characterization prior to permitting. The final cost analysis is described in Section VIII of the Preamble, and details are reported in Chapters 6 and 7 of the Economic Analysis and in the Technical Development Document.

The two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the “fast track” (Track I), or by demonstrating the same level of performance as the Track I requirements under the “demonstration track” (Track II).

Another option, defined under Section 125.85 an alternative to Track I and II states that if "the EPA Administrator determines that the data specific to the facility indicate that compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs EPA considered in establishing the requirement at issue". As described in 125.85 (b) "The burden is on the person requesting the alternative requirement to demonstrate that alternative requirements should be imposed."

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Subject Matter Code 10.04

Site-specific Permit Flexibility

The Site-Specific Approach Should Allow an Option to Install Pre-Approved Technology to Reduce Administrative Costs

The cost of developing and implementing a site-specific approach – including the costs of delay in getting facilities constructed – may not be justified in all situations. It would be useful to include an option to allow a facility to install pre-approved highly protective CWIS technology in the interest of reducing administrative costs and reducing the delay in obtaining a permit. Such a provision would not detract from the gains from the site-specific approach – which the facility owner could select – and would have the advantage of providing greater flexibility. It is appropriate to give the facility owners the option because they would be in the best position to judge whether the added costs of developing site-specific information justified the added gains from a tailored site-specific determination.

EPA Response

EPA agrees that a facility should have the option of installing a highly protective technology in order to avoid delays and costs associated with site specific biological characterization. "Highly protective technology" represents the statutory standard best available technology for minimizing adverse environmental impact.

Under the final rule, EPA has adopted a two-track approach. Section 122.21 details the information required in order to submit an application. The Source Water Baseline Characterization required under Track I includes existing and available data (the permitee may supplement the data using newly conducted field studies if they choose to do so). The remaining requirements under Track I are technology based and are designed to avoid delays in permitting new facilities.

Under Track II, the applicant has the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements for capacity, design velocity, and design and construction when applied to a shoreline intake at the new facility site. Proportional flow requirements also apply under Track II. Taking Track II requires a more extensive Source Water Baseline Characterization in order to demonstrate that requirements are being met with an alternative technology.

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Subject Matter Code	18.2
Compliance Cost/Revenue Test	

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BTA Determinations Should Be Based upon the Criterion of Maximizing the Net Benefits of Fish Protection Alternatives

EPA also has proposed a major shift in the criterion for determining BTA. EPA proposes to change from a criterion based upon comparison of costs and benefits to a criterion that compares costs to the revenues from the facilities. This "affordability" test is not a sufficient test from an economic perspective for determining what technology should be BTA.

* Affordability does not provide a way of systematically evaluating the environmental benefits and costs of alternative technologies.
* Affordability ignores consideration of the costs and benefits of BTA alternatives.
* Affordability ignores consideration of the incremental effects and incremental costs of increasingly stringent (and expensive) alternatives.
* Affordability ignores other impacts of cooling water intake technologies.

Appendix E concludes that BTA determinations should be based upon a benefit-cost test. This test would involve determining the applicable fish protection alternatives, assessing their incremental costs and benefits in dollar terms to the extent feasible, determining major uncertainties in the analysis, assessing whether relevant costs or benefits have not been quantified, and developing a BTA choice that is likely to maximize net benefits in the particular case. This cost-benefit test would identify the best technology from an overall societal perspective.

This benefit-cost test is superior to the current "wholly disproportionate" test mentioned in a few case decisions. The "wholly disproportionate" test is not consistent with the economic objective of maximizing the net benefits from BTA determinations. The test appears to be motivated by an unsubstantiated assumption that measured benefits are consistently and significantly understated relative to costs, perhaps based upon limitations in benefit assessment methodology. Whatever the motivation, advancements in benefit assessment methodologies and empirical studies in the last two decades provide ample basis for using an appropriate benefit-cost test.

EPA Response

EPA disagrees with the comment that BTA determinations for this rule for new facilities should be based upon the criterion of maximizing the net benefits of fish protection alternatives or a wholly disproportionate cost test. First, the total annualized cost of the final rule is relatively low, under $50 million per year. In addition, EPA evaluated the requirements of the final rule by considering the annualized compliance costs of the rule compared to the estimated facility revenues, as well as the initial compliance costs compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under

sections 301 and 306 of the CWA, to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA. See response to 316bNFR.206.014.

EPA believes this approach is appropriate for new facilities due to the record which shows new facilities can afford the requirements and because fast track permitting is far more desirable for new facilities than the approach suggested by the commenter.

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Subject Matter Code	24.0
Economic and Engineering Analysis (EEA)	

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EPA's Engineering and Economic Analyses
EPA Should Reevaluate its Cost Analyses in Light of Various Concerns

The EEA provides estimates of the potential costs of the proposed regulations that appear to suffer from several major concerns. These concerns include an understatement of the number of facilities subject to the regulation, understatement of the full costs of closed-cycle cooling water systems, and disregard for some potential options that would be more cost-effective.

Appendix E recommends that EPA reevaluate its cost analysis in light of these concerns. The objective should be to develop a reliable methodology for estimating the costs of the proposed alternative as well as the costs of regulatory alternatives.

EPA Response

EPA has considered each of the analytic issues raised by the commenter, and does not agree with the conclusion that the analysis underestimates the cost of compliance due to the rule.

Understatement of the number of facilities subject to the regulation: Since proposal, EPA has updated and expanded its research into the number and characteristics of new in-scope facilities. As a result, the estimated number of new in-scope electric generators has more than doubled, from 40 in the proposal analysis to 83 in the final rule analysis. For more information on EPA's estimate of the number of new in-scope electric generators, see Chapter 5: Baseline Projections for New Facilities.

Understatement of the full costs of closed-cycle cooling water systems: For discussion of the commenter's assertions regarding costs of cooling towers see responses to comments 316bNFR.068.329, 316bNFR.068.330, 316bNFR.068.332, and 316bNFR.368.001 through 316bNFR.368.013.

Disregard for some potential options that would be more cost-effective: For the final rule analysis, EPA has considered additional regulatory alternatives. Analyzed alternatives include several options that are less stringent than the final rule and one option that is more stringent than the final rule. EPA also considered an alternative proposed by representatives of the regulated industries. See Chapter 10: Alternative Regulatory Options of the Economic Analysis document for more information on the regulatory alternatives considered for the final rule.

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Subject Matter Code 24.5

EEA - Estimation of Benefits

EPA Should Complete its Benefits Analyses

The EEA does not provide a full analysis of the potential benefits of the proposed regulations. Indeed, EPA's benefits analysis does not conform to the Agency's guidance for preparing benefit assessments. Although EPA's guidance indicates that the analysis should include assessments of the physical effects of the proposed regulation on recreational and commercial catch, for example, the EEA does not include such estimates. It also does not provide monetary values for benefits.

The EEA shows seven steps from publishing the proposed rule to determining the benefits ("monetized changes in welfare") of the rule. "However," the EEA says, "because of data and time constraints, this benefits analysis is limited to only the first four steps of the process." EEA at 11-22. Hence EPA's analysis stopped with calculating the numbers of fish saved and did not try to determine the value of these fish to the ecosystem (step 5), the effect this would have on people's use of the ecosystem (step 6), or the monetized changes in welfare that would result (step 7).

The result is that EPA is missing a critical part of what it needs to comply with both its own guidelines and Executive Order 12866 and to provide a process for deciding what is "best" technology as required by § 316(b).

EPA should complete its benefits analyses. The complete analysis should conform to the Agency's guidelines. The objective of the benefits assessment is to provide the basis for evaluating the benefits of the proposed alternative as well as the benefits of regulatory alternatives.

EPA Response

As clearly noted and acknowledged in Chapter 11 of the EEA, "EPA was unable to conduct a detailed, quantitative analysis of the proposed rule because much of the information needed to quantify and value potential reductions in I&E at new facilities was unavailable" (EEA, p 11-1). The chapter then proceeds to detail the types of information that would be required to do the analysis for new sources (the chapter also offers some illustrative examples using data that are available to provide examples of potential benefits based on site-specific studies of some existing facilities).

While EPA acknowledges that is has not developed a quantitative benefits analysis for the New Facilities rule, the Agency disagrees with the statement that it has thereby failed to conform with its own guidance or with the requirements of Executive Order 12866. For rulemaking efforts where a reliable quantitative analysis of benefits is reasonably feasible, it is the Agency's objective to furnish such estimates. However, both EPA's guidance and the Executive Order recognize that useful quantitative estimates are not always feasible to produce, and that in such circumstances a qualitative discussion of benefits should be furnished instead. This is what the Agency has done.

Therefore, the commenter is accurate in the sense that it points out what the Agency acknowledges at the outset, namely that a quantitative benefits analysis was not feasible for the proposed rule for new sources. The comment, however, does not offer data or methodologies that would enable the Agency to overcome these constraints. Because the gaps still exist in the types of information required to conduct a more comprehensive benefits analysis, the Agency has been unable to appreciably expand upon the economic portions of its benefits analysis for the final new sources rulemaking. However, for existing facilities, some of the key data limitations may be more readily overcome because baseline conditions for the facilities and the impacted aquatic ecosystems can be identified and studied (whereas these perspectives are not available for new sources with unknown locations).

Finally, EPA wishes to note that the Agency's Guidelines for Preparing Economic Analysis are, as the title states, "guidelines" and not strict requirements. Consistent with these guidelines and standard professional best practices, it is the Agency's intent to develop economic analyses that are as complete and reliable as is feasible for its rulemakings. However it is neither required nor prudent for EPA to develop empirical estimates of benefits where data limitations and/or other critical constraints preclude doing so in a credible and reliable manner.

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Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

EPA Should Prepare an Appropriate Evaluation of Alternatives

The EEA considers three alternatives: (1) the proposed national BTA standards that differ somewhat by location, (2) national BTA standards equal to the most stringent that would apply at all locations, and (3) a "zero flow" requirement. These represent too limited a set of alternatives. Neither of the two alternatives is less stringent than the proposed regulations. Moreover, the discussion of even these limited alternatives is cursory. The analysis of alternatives does not comply with Agency guidelines.

EPA should expand its evaluation of alternatives for the proposed rule. EPA requests comments on a wide range of regulatory alternatives. EPA's analysis should provide information on a sufficiently large number of these alternatives so that it is able to make (or explain) its choices. At the very least, the analyses should include assessments of the costs, benefits, and other effects of the site-specific approach as an alternative to the national minimum technology-based approach.

EPA Response

EPA disagrees that too few alternatives have been considered for the final rule. The Agency considered and analyzed many regulatory alternatives (some proposed by the commenter, as well). See Section V of the preamble to the final rule for a discussion of the variety of options analyzed. EPA notes that several options were based on technology bases that were less stringent or more stringent than the final preferred framework.

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Subject Matter Code 23.5

Executive Orders

EPA Should Comply with the Requirements of Executive Order 12866

Executive Order 12866 requires agencies to prepare economic analyses of potential regulations. The EEA does not conform to the requirements of Executive Order 12866 for reasons that include the following:

* The EEA does not document that the potential benefits to society justify the potential costs.
* The EEA does not document that the proposed regulations would maximize net benefits to society.
* The EEA does not show that EPA has considered the most important alternative approaches.

The EEA should be completed and revised to comply with these and other requirements of Executive Order 12866.

EPA Response

EPA disagrees with the comment that economic analysis fails to comply with Executive Order 12866 by failing to document potential benefits and failing to propose a regulation that maximizes net benefits to society. The total annualized cost of the final rule are relatively low, under $50 million per year, and thus EPA is not required to complete analysis for a "Major Rule" under Executive Order 12866.

For the final rule analysis, EPA has considered additional regulatory alternatives. Analyzed alternatives include several options that are less stringent than the final rule and one option that is more stringent than the final rule. EPA also considered an alternative proposed by representatives of the regulated industries. See Chapter 10: Alternative Regulatory Options of the Economic Analysis document for more information on the regulatory alternatives considered for the final rule.

Comment ID 316bNFR.068.145

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

Author Name Terry M. Hogan & David E. Bailey

Organization Utility Water Act Group c/o Hunton & Williams

EPA Underestimates How Many Plants Will Be Subject to the Rule

As Appendix E points out, there are concerns with the data, assumptions, and methodologies in the EEA suggesting that EPA may have understated the number of facilities to be affected by the proposed rule. The shortness of the comment period did not permit UWAG to gather detailed information on this issue, but we were able to do a quick, informal survey of our members. Of 22 companies responding, almost half contemplate significant new construction.

One company reports that it will add at least one facility that withdraws at least 2 MGD of cooling water after August 13, 2001. A second company has tentative plans to construct several units and has ordered an additional 48 combustion turbines to be installed in new facilities by the end of 2004. A third company plans to add 5 units in the period 2003-2020, but this facility will probably use a closed-cycle cooling pond. A fourth plans three units between August 2010 and August 2020. A fifth plans to add 1,000 to 2,000 MW by August 13, 2010. A sixth plans to add 600 MW by 2007 and possibly an additional 600 MW by 2009. A seventh company has no plans to build but has contracts for energy from a planned facility and further need for an additional 200 MW, all likely to be built between 2001 and 2010; the same company perceives the need for an additional 500 MW between 2010 and 2020. An eighth company foresees the possibility of needing as much as 20,000 MW of new generation over the next 10 years. A ninth company plans a large number of new facilities over the next 10 years (although it is uncertain where these facilities will be located or whether they will use surface water) and foresees the possibility of needing as much as 20,000 MW of new generation.

Also, as we expect will be recounted in comments to be filed in this docket by the Edison Electric Institute (EEI), there is now a new study showing that EPA's estimate of the number of plants to be affected by the rule is underestimated. Recently OnLocation, Inc., and the EOP Group, Inc. gathered information about the number of new generating facilities likely to be subject to the rule. EPA estimated that only 40 plants over the next 20 years will be subject to the proposed rule. But when OnLocation and the EOP Group collected more reliable information on a number of projects screened by EPA, they found that the estimate should be 209 plants, more than five times what EPA estimated.

EPA Response

EPA appreciates the information provided by the commenter and has considered each of the analytic issues raised. Unfortunately, the commenter did not provide sufficient information on the cited capacity additions for EPA to utilize this information in its analyses. However, since the proposal analysis, EPA has updated and expanded its research in order to reflect the most recent data available. EPA's new research found that 83 new electric generators will be subject to the final rule. For information on EPA's projection of the number and cooling water characteristics of new in-scope electric generators, see response to comment 316bNFR.042.003 and Chapter 5: Baseline Projections

of New Facilities in the Economic Analysis document.

EPA disagrees with the findings in the report prepared by OnLocation and the EOP Group. As documented in EPA's response to Appendix A of EEI's NODA comments (316bNFR.525.101), EPA believes that the findings are based upon flawed analyses. See response to Appendix A for further detail.

Comment ID 316bNFR.068.146

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Subject Matter Code 22.1

CWIS Impacts and Benefits

Effect on the Electric Power Supply

In reviewing the proposed rule, members of the electric utility industry have become increasingly concerned about its impact on the electric power market. In parts of the country this past summer there were well-publicized power shortages. Also well-publicized are the recent increases in the price of petroleum.

Recently the Chairman of the Federal Reserve Board called attention to the importance of electric power supply, telling Congress that he was worried about instability in the electric power industry (Greenspan 2000). As noted in the Agency's EEA, the demand for power is projected to continue increasing in the next decade. In part this demand will come from the need for power of the Internet, with its routers, servers, and amplifiers. By one estimate the Internet draws 290 billion kilowatts of electricity in the United States alone. And an average microchip processing plant uses enough power to run 50,000 homes.

The power industry has the responsibility to make sure electricity is available, reliable, and affordable. The proposed rule clearly would affect whether, when, and what new electric generating facilities could be built. The sites suitable for building new generating stations are limited. A power producer must find a site with a combination of features, including access to the transmission grid and to a source of fuel (a gas pipeline, for instance). Any rule that further restricts the choice of sites will affect the reliability of the power supply.

Moreover, the rule will apply to new facilities that already are on the drawing board or even have gone so far as to apply for permits. Yet if such facilities have not "commenced construction," they will be sent back to square one, both by new technology requirements and by the requirement to plan, get approval of, and conduct a BBC. EPA has not considered any of the economic or social costs that will flow from delaying the first wave of new projects that would otherwise have been built by 2002-2004.

And these problems come at a time when the electric utility industry is being deregulated. This increases the cost pressures on utilities. See generally EPA 1997; EEA p. 3-26. In this competitive environment, with viable sites already in short supply, EPA's proposed § 316(b) rule could be a significant threat to the national energy supply. As just one example, consider that California policy favors using saltwater for cooling and discourages siting power plants on freshwater bodies <FN 105>. EPA's rule, on the other hand, will make it much harder to site plants on estuaries.

There is a serious danger that the proposed rule, especially in combination with other requirements like wetlands laws and total maximum daily loads, will cause power plants to be "zoned out" of most of the places where they might otherwise have been. Even if a new plant could meet the water-related requirements of the new rule, it might find itself barred by Clean Air Act requirements. Drift from

cooling towers contains concentrations of total dissolved solids (TDS) and total suspended solids (TSS) that are dependent on the source of the make-up water and the cycles of concentration of the circulating water. Although high cycles of concentration reduce the withdrawal rate of make-up water, this mode of operation results in significant particulate emissions of TDS and TSS to the atmosphere. These emissions can be substantial when the source of the make-up water is brackish or has high TDS and TSS concentrations.

Also, it may be difficult or impossible to obtain an air permit for mechanical draft cooling towers that allow for high cycles of concentration but have access to limited make-up water. Mechanical draft cooling towers have short stacks and physical dimensions that allow for aerodynamic downwash of the vapor plume and drift in the immediate vicinity of the tower. Ground level impacts caused by aerodynamic downwash and high particulate emissions can be excessive and may be prohibited by Prevention of Significant Deterioration (PSD) regulations and ambient air quality standards.

We have said that cooling towers exact an energy penalty. The more that cooling towers are required, the more replacement power will be needed. This is likely to result in more petroleum being imported from overseas and more dependence on the Middle East.

The overall result on the power supply cannot be fully predicted, and certainly not without study. One source of uncertainty is the future EPA § 316(b) rulemaking for existing facilities, which may further affect how much power continues to be generated by existing facilities. But EPA has done no analysis of this sort.

Footnotes

105 The California State Water Resources Control Board has adopted Resolution No. 75-58, Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted June 19, 1975). Noting that there is a limited supply of inland water resources in California, the Resolution states that the source of powerplant cooling water should come from the following sources in this order of priority, depending on site specifics: (1) wastewater being discharged to the ocean, (2) ocean, (3) brackish water from natural sources or irrigation return flow, (4) inland wastewaters of low TDS, and (5) other inland waters. Because of this policy, it is unlikely that a new power plant can be built with open-cycle cooling anywhere except near the coast.

EPA Response

The commenter raises a number of issues.

First, the commenter claims that any rule that further restricts the choice of sites will affect the reliability of the power supply. EPA maintains that this rule will not restrict the choice of sites (see response to comment 316bNFR.014.023 above) and will not affect the reliability of the power supply (see response to comment 316bNFR.512.003 (comment category 23.6). The commenter cites California's preference for saltwater. In contrast to the proposed rule, the final rule does not establish different requirements for different water body types. Therefore, the final rule does not make it harder to site plants on estuaries.

Second, EPA disagrees with the comment that it has not considered any of the economic or social costs that will flow from delaying the first wave of new projects that would otherwise have been built by 2002-2004. The two-track approach allows facilities to avoid delays in facility siting or operation by complying with the requirements of Track I. EPA's analysis shows that 93 percent of in-scope

combined-cycle facilities and 71 percent of in-scope coal facilities already comply with the requirements of Track I in the baseline and therefore would not experience any operational delays. EPA therefore believes that the final section 316(b) New Facility Rule will not result in significant costs associated with delays in new facility operation.

Third, the commenter cites air quality impacts from the installation of cooling towers. Again, EPA's analysis shows that 93 percent of in-scope combined-cycle facilities and 71 percent of in-scope coal facilities already plan to build a cooling tower in the baseline. These facilities find it technologically possible and economically practicable to do so. EPA therefore believes that the same will be possible for other facilities. In addition, EPA has conducted analyses of potential air quality effects of the final rule and found these to be minimal. See response to 316bNFR.068.100; 014.019; and chapter 3 of the TDD.

Fourth, the commenter points to the energy penalty, and the result on the power supply, associated with cooling towers. As mentioned above, the majority of new in-scope generators already plan to install cooling towers in the baseline and will not be subject to an energy penalty as a result of the rule. For EPA's analysis of potential energy effects, see Chapter 9 of the Economic Analysis document and response to comment 316bNFR.512.003 (comment category 23.6).

Comment ID 316bNFR.068.147

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

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The Applicability Criteria Are Inappropriate or Unclear

The Definition of CWIS is Unclear

The definition of "cooling water intake structure" (40 C.F.R. § 125.83) is confusing at best. See 65 Fed. Reg. 49,116 col. 1. Among other things, it says that the CWIS extends from the point at which water is withdrawn from the surface water source to the first intake pump or series of pumps. This definition should be revised to clarify that pumps are not included <FN 106>. They cannot be, because as an engineering matter pumps are without question not part of the ordinary meaning of "intake structure." See Part III.D. above. UWAG urges EPA to clarify that the circulating water pumps do not fall within this definition.

Moreover, the definition includes within the CWIS "associated constructed waterways used to withdraw water." EPA does not define or explain this term. Because EPA says the CWIS extends "from the point the water is withdrawn from the surface water source," and given its suggestion, discussed below in Section XII.A.5, that some types of man-made thermal treatment systems may be waters of the United States, the inclusion of "associated constructed waterways" is bound to create confusion.

Footnotes

106 The pumps are, of course, a necessary part of the cooling water system, but it does not necessarily follow that they are part of the intake structure.

EPA Response

EPA disagrees that the pumps should be excluded. In response to other comments, EPA has clarified the definition of cooling water intake structure to explicitly include the intake pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed. See Section VI.A.2 in the preamble of today's rule.

EPA has not defined the phrase an "associated constructed waterway." Whether a waterway is considered part of the cooling water intake structure can vary depending on the location and type of facility and other factors. EPA has left this determination up to the permit writer who will evaluate each situation on a case-by-case basis. For purposes of this rule, an "associated constructed waterway" might include, but not be limited to, a cooling canal, intake embankment, or any waterway that directs water into the cooling water intake structure.

Comment ID 316bNFR.068.148

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Subject Matter Code 7.1

Definition: New Facility

EPA's Reference to the Existing Definition of "New Source" Creates Ambiguity

The proposed rule applies to "new facilities," and new facility is defined to mean "new source" or "new discharger" in 40 C.F.R. §§ 122.2 and 122.29(b)(1), (2), and (4). 65 Fed. Reg. 49,116 col. 3. Section 122.29, in turn, includes criteria for new source determinations that cover any source (1) which "totally replaces the process or production equipment that causes the discharge of pollutants at an existing source, or (2) has processes "substantially independent of an existing source at the same site." See 40 C.F.R. 122.29(b)(1)(2). EPA says that it intends the rule to cover only "greenfield" and "stand-alone" facilities. 65 Fed. Reg. 49,066 col. 1. But the reference to "new sources" and "new dischargers" muddles this intent, because the criteria cited above could be expansively interpreted to cover significant modifications or expansions of existing facilities.

Furthermore, the definition of "new facility" fails to draw necessary distinctions between an entirely new facility built on a previously undeveloped site, and a replacement facility built on the site of an existing facility that is being shut down. If the new facility on the previously undeveloped site draws any water from a waterbody, the net effect of the new facility is to increase the amount of water being used. In contrast, the shutdown and replacement of an existing facility at a "brownfield" site frequently will drastically reduce the amount of water being used, especially when an older steam plant with once-through cooling is retired and replaced with a combined-cycle plant employing closed-cycle cooling. By treating both "greenfield" and "brownfield" facilities identically as "new facilities," the proposed rule forgoes creating any incentive to encourage development that yields a net reduction rather than a net increase in water use. In contrast, EPA's rules implementing the Clean Air Act's Prevention of Significant Deterioration (PSD) program expressly recognize that emission reductions resulting from the shutdown of an older facility can be netted against the new emissions from a replacement facility on the same site to avoid triggering permitting requirements. 40 C.F.R. § 52.21(b)(3)(i)(b).

In addition, the proposed rule draws arbitrary distinctions between a complete replacement of an existing facility, and a repowering of the same facility that replaces the combustion source (for example, replacing a boiler with a gas turbine) but does not replace the steam turbine or turbines. The complete replacement is normally more efficient than the repowering, because it reflects advances in the design of steam turbines, and also because it uses steam turbines that are specifically designed to be used with the new combustion source. The increased efficiency brings not only economic advantages, but environmental advantages as well. The more efficient unit burns less fuel to produce each megawatt-hour of electricity, and will thus emit a smaller quantity of air contaminants and greenhouse gases for each megawatt-hour produced. Unfortunately, the proposed rule may treat the repowered facility as an "existing facility," because it does not totally replace the old facility's process or production equipment, while the complete replacement is considered a "new facility." The proposed rule therefore creates an incentive to use less efficient, more polluting technology for the redevelopment of older sites.

For these reasons, the replacement or repowering of an existing facility should not be considered a "new facility."

EPA also says that a modified CWIS is one that has some part of the intake, including the pumps, changed, replaced, or expanded to accommodate, in whole or in part, a new facility's water usage. 65 Fed. Reg. 49,066 col. 1-2. As noted above, the circulating water pumps typically are not included as part of the CWIS per se, suggesting that this reference is inappropriate. Even if they were, it is common practice in the electric utility industry to change out pumps and other equipment periodically. Such equipment gets hard use and must be replaced from time to time, to maintain capacity and prevent head loss. When one or more pumps is replaced, it may not be possible to find the exact same pump, or the same vintage. Or, it may be desirable to replace the pump with a newer model that is more flexible, efficient or durable. EPA should clarify that replacement of existing pumps in and of itself does not trigger the application of these requirements, even if a new facility subsequently hooks in behind the pumps. This kind of replacement, absent a major change in the number or capacity of pumps, will not appreciably alter the capacity of the circulating water system, and does not afford the kind of opportunities for re-design that would justify application of these rules.

EPA's definition also ignores other key issues as to which the rule will create enormous confusion. Specifically, neither in the definition of the facilities covered by the rule nor anywhere else does EPA address how facilities that have submitted NPDES permit applications (or even received a permit) but not "commenced construction" will be treated. This is important, because obtaining all necessary permits is often a predicate for obtaining financing for the construction phase of a project. It is not clear whether EPA envisions that some or all of the following scenarios will prevail:

1. permit applicants unfortunate enough to be awaiting permits on the date of the final rule will return to square one to perform BBC studies;
2. permit writers simply will not issue, or EPA will not approve, permits for new facilities until this rule is finalized;
3. permit applicants may obtain final, approved permits that will remain in effect for the permit term but, if they commence construction after the date of the rule, they will be treated as "new facilities" upon permit renewal, even though they demonstrably are not new; or
4. final permits issued before the effective date of the rule to facilities that are unable to commence construction until after that date will be modified or revoked and reissued – a result the NPDES rules do not now authorize (see 40 C.F.R. § 122.62).

In short, without concrete answers to these questions, EPA's rule will sow confusion, and create unnecessary and unproductive delay. UWAG strongly recommends that EPA avoid this by clarifying the rule to provide that facilities that have obtained final and effective permits before the date of the final rule will not be treated as new facilities. EPA also should clarify the rule to ensure that permit applicants whose applications have been judged complete before the date of any final rule are not required to perform any mandatory minimum baseline studies that EPA may decide to include (although they may do any tailored site-specific studies that are needed to make a site-specific judgment, should EPA adopt the site-specific approach UWAG recommends).

EPA Response

See response to 316bNFR.030.003.

Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule. Thus, the rule allows for numerous types of changes to existing facilities, while defining new facilities in a manner consistent with existing NPDES definitions addressing new sources and new dischargers.

EPA does not agree that this rule fails to reasonably distinguish between new greenfield facilities and replacement facilities and that it removes any incentive for existing facilities to use more efficient technology. Not all replacement facilities are treated identically under this rule. As discussed above, a replacement facility may or may not be subject to this rule depending on whether it totally replaces the process or production equipment that causes a discharge at an existing facility, and whether it uses a new cooling water intake structure or a modified intake structure that increases existing design capacity. Thus, a replacement facility that uses an existing or modified cooling water intake structure that results in a net reduction in water use (and does not otherwise increase existing design capacity) is not subject to this rule, but will be addressed under Phase II or Phase III.

Nor does EPA agree that the rule draws an arbitrary distinction between complete replacement and partial replacement of an existing facility. The distinction contained in the rule is based predominantly on the existing NPDES regulations addressing new sources and new dischargers. These regulations draw a reasonable distinction between facilities that can most efficiently design best technology available into a replacement facility and those that face limits due to the type or scope of the modifications they are making. As described above, the definition of a new facility in the final rule applies to a facility that is repowered only if the existing facility has been demolished and another facility is constructed in its place, but modifies the existing cooling water intake structure to increase the design intake capacity. To the extent commenters assert some inequity of treatment between new facilities and certain existing facilities, EPA will address this comment when it addresses what substantive requirements apply to existing facilities. Further, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility (e.g., partial repowering), and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. EPA does not agree that by not addressing most repowering under this rule the Agency is creating an incentive to use less efficient technology. Both the power- generating and manufacturing industries routinely seek greater efficiency when repowering. This is illustrated by the increased use over the past 10 years of combined-cycle technology, which requires significantly less cooling water for a given level of power

generation and is a more efficient process than older technologies.

In the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the first intake pump or series of pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed. Section 316(b) authorizes EPA to impose limitations on the volume of the flow of water withdrawn through a cooling water intake structure as a means of addressing “capacity.” See Section VI.A.2 of the Preamble to the final rule. It is also important to note that, as discussed above, replacing pumps does not, by itself, necessarily make a facility a new facility.

Finally, the Agency chose the commencement of construction date because it was generally consistent with the term "new source" in the existing NPDES permitting regulations and it should provide adequate notice and time for facilities to implement the technological changes required under the rule. The date a facility commences construction is clarified at 40 CFR 122.29(b)(4). This provision describes certain installation and site preparation activities that are part of a continuous onsite construction program; it includes entering into specified binding contractual obligations. Thus, under the final rule facilities that are constructed or commence construction within the meaning of 40 CFR 122.29(b)(4) prior to or on the effective date of the final rule are not new facilities. Those that commence construction after the effective date of this rule and meet the other regulatory thresholds defined in § 125.81 are subject to the requirements of this rule.

Comment ID 316bNFR.068.149

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Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

The 25 Percent Flow Criterion Has No Basis

The proposed rule defines "cooling water intake structure" to include structures that withdraw surface water at least 25 percent of which is used for cooling. Proposed 40 C.F.R. § 125.83, 65 Fed. Reg. 49,116 col. 1. EPA's only explanation for the choice of 25 percent, versus some higher number, is that using 25 percent will ensure that "almost all cooling water" withdrawn by new facilities will be subject to this rule. 65 Fed. Reg. 49,067 col. 1. This amounts to no rationale at all. In § 316(b), Congress did not say what a CWIS was, but clearly it thought of such structures as discrete from intake structures used for other purposes. Yet EPA's proposed definition reaches out to capture intake structures that, far from being used to withdraw water solely or primarily for the purpose of cooling, withdraw water primarily for some other purpose. This is not supportable from either the language or the purpose of § 316(b).

UWAG believes that, to qualify as a CWIS, the vast majority of the water withdrawn must be used for cooling. Thus, we suggest that EPA use a value between 75 and 100 percent.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.068.150

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Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

The Two MGD Criterion Is Too Low

Proposed § 125.81 would apply the new rule to new facilities that have a design intake flow of greater than two million gallons per day (MGD). This is an arbitrary cut-off and moreover is much lower than it should be. As discussed above, there is ample evidence that much greater flows (including flow at existing power plants with cooling towers)<FN 107> have not caused AEI, and we believe that EPA should examine that information to identify a more biologically based de minimis cut-off. By way of example, Maryland uses a de minimis threshold of 10 MGD, and a recent assessment of § 316(b) implementation in Maryland suggests that its program has worked well to protect state resources (Richkus 1998). It is entirely inappropriate to decide on a de minimis threshold designed solely to subject the vast majority of facilities to these regulations, as EPA has done. 65 Fed. Reg. 49,067 col. 1.

Footnotes

107 For example, a flow of 2 MGD would only be sufficient for a 270 MW combined cycle plant with a recirculating cooling water system.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities and because EPA has a record basis to find the requirements of the rule economically practicable and technically achievable for facilities greater than 2 MGD on a national basis. EPA believes that economic practicability of any requirements at facilities below 2 MGD should be developed on a case-by-case basis. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

The Maryland study the commenter references was a study to determine whether power plants were having cumulative impacts on the Chesapeake Bay. It does not address localized impacts which would be most appropriately considered for determining thresholds.

Comment ID 316bNFR.068.151

Subject Matter Code	7.3
Definition: Waters of the US	

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Cooling Ponds Are Not Waters of The United States

EPA says that cooling ponds are considered "waters of the U.S." if they meet the criteria of the 40 C.F.R. § 122.2 definition quoted below. Facilities that withdraw cooling water from cooling ponds that are waters of the U.S. and that otherwise meet the criteria of the new rule would be subject to the rule. EPA invites comment on the applicability of the rule to facilities on cooling ponds. 65 Fed. Reg. 49,067 col. 2.

From this brief, oblique statement, it is unclear whether EPA means that all cooling ponds are waters of the U.S. if they meet any of the jurisdictional criteria spelled out in 40 C.F.R. § 122.2(a)-(g), or whether EPA also intends to recognize the exemption for "waste treatment systems" (and the note suspending a restriction within that exemption) included at the end of the definition.

EPA's regulation, 40 C.F.R. § 122.2, exempts waste treatment systems from the definition of "waters of the United States." The definition reads as follows:

Waters of the United States means:
(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(b) All interstate waters, including interstate "wetlands;"
(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;
(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
(3) Which are used or could be used for industrial purposes by industries in interstate commerce;
(d) All impoundments of waters otherwise defined as waters of the United States under this definition;
(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;
(f) The territorial sea; and
(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Note 1 at the end of § 122.2 reads:

At 45 FR 48620, July 21, 1980, the Environmental Protection Agency suspended until further notice in § 122.2, the last sentence, beginning "This exclusion applies . . ." in the definition of "Waters of the United States." This revision continues that suspension.

(Footnote omitted.)

Thus waste treatment systems, including ponds and lagoons designed to meet Clean Water Act requirements (which cooling ponds clearly are), are specifically exempted. Such systems, if created in waters of the United States, were at one time brought back within the application of the other criteria in the definition by the restrictive provision at the end of the waste treatment exemption; however, that restriction was suspended in 1980 and no longer has any legal effect. Cooling ponds "as defined in 40 C.F.R. 423.11" also fall outside the waste treatment system exemption. But the rule containing the definition of "cooling ponds" cited in that parenthetical, and which served as the basis for that restriction, was set aside by the Court of Appeals in Appalachian Power Co. v. Train, 566 F.2d 451 (4th Cir. 1977). Thus, as a matter of law, the cooling pond exclusion from the treatment system exemption no longer has any force or effect.

In short, cooling ponds are treatment systems and not "waters of the United States."

EPA Response

EPA did not intend the discussion of cooling ponds in the preamble to the proposal (65 FR 49067, col. 2) to change the regulatory status of cooling ponds. Cooling ponds are neither categorically included nor categorically excluded from the definition of "waters of the United States" at 40 CFR 122.2. EPA interprets 40 CFR 122.2 to give permit writers discretion to regulate cooling ponds as "waters of the United States" where cooling ponds meet the definition of "waters of the United States." See December 13, 1993 Memorandum from Robert Perciasepe, Assistant Administrator, to W. Ray Cunningham, Director, Water Management Division (EPA Region 4), "Waters of the United States" Determination for A Proposed Cooling Pond Site in Polk County, Florida. The determination whether a particular cooling pond is or is not "waters of the United States" is to be made by the permit writer on a case-by-case basis, informed by the principles enunciated by SWANCC. SWANCC held that usage by migratory birds as habitat was not a basis for asserting Clean Water Act jurisdiction over isolated, intrastate, non-navigable ponds. (EPA notes that § 125. 83 of today's rule explicitly recognizes that cooling ponds, canals, channels, or lakes can be part of a closed-cycle recirculating system.)

Comment ID 316bNFR.068.152

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Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

EPA Should Not Impose CWIS Restrictions On A CWIS That Is Not Owned By the NPDES-Permitted Facility

EPA has sought comment on how to handle facilities that use cooling water that is withdrawn through an intake structure controlled by a different party. For example, EPA says a number of facilities operated by separate entities might be located on the same, adjacent, or nearby property, and one of these facilities might take in cooling water and then transfer it to the other facilities for use as cooling water. Or some facilities might use municipal water that is withdrawn from a water of the U.S. as their source of cooling water. 65 Fed. Reg. 49,069 col. 1.

But EPA's legal authority derives from the discharge of a pollutant to waters of the United States. The Clean Water Act does not regulate withdrawal of water independent of discharges.<FN 108> Indeed, to be covered by § 316(b) at all, one must be a point source subject to effluent limits. Municipal water suppliers will not meet this requirement.

While sources of "gray water" may meet that definition, it would be counterproductive to attempt to apply these requirements to either the supplier or user of water in such an arrangement. "Gray water" means treated effluent produced by a source, which otherwise would be discharged after treatment. Most treatment systems are designed and sized to treat a certain amount of raw water containing certain kinds and concentrations of pollutants. The cost of building and operating a treatment system typically is related to its size, among other factors. It is unlikely that a source would incur the substantial costs associated with building and operating a larger treatment system simply so that it could withdraw more intake water and produce more gray water to meet another user's cooling needs. Also, treating gray water sources as "CWIS" would provide a disincentive for re-use of treated water and exacerbate reliance on new surface water withdrawals. This makes no sense as a matter of public policy.

Furthermore, were EPA to take this course of action, it would have to completely redo its cost analysis, because many of the new facilities it screened out and did not analyze were sources that anticipated using municipal and/or gray water. See, e.g., RDI NEWGen Summary Charts (DCN:1-6001-AD). Including those sources likely would increase the cost of the rule substantially, and certainly would require, at a minimum, publication of a "Notice of Data Availability" to allow for public comment on the revised analysis.

Equally important, if EPA were to retain its proposed performance standards and apply them to third parties who own intakes which supply cooling waters to other facilities, the Agency would be creating a bureaucratic nightmare. The rules require the use of recirculating cooling by facilities for which the CWIS is located in any part of an estuary or tidal river, or within 50 meters of the littoral zone in any other type of waterbody. But, even assuming this performance standard is justified, it could not be met by a third party which did not also control the circulating water system. (This fact alone illustrates

UWAG's point that the Agency has reached well beyond its jurisdiction – which extends only to the CWIS – in this proposed rule.) EPA does not explain how and on whom a regulator would impose requirements to ensure that the § 316(b) performance standards are met, nor could it, as there is no logical, efficient system for doing so. In short, the only rational course is to impose § 316(b) requirements only on those point sources that also own and operate their own CWIS.

Footnotes

108 PUD No. 1 of Jefferson County v. Washington Dep't of Ecology, 511 U.S. 700 (1994), which observed that there is a connection between water quality and water quantity, is not to the contrary. It interpreted § 401 of the Act, which applies to state certification that federal permitting activities will not violate water quality standards. There must still be some activity that triggers the federal permitting authority, and in the case of the Clean Water Act that activity has to be discharging a pollutant to waters of the United States or the discharge of dredged or fill material under § 404.

EPA Response

The final rule provides specifically that use of cooling water does not include obtaining cooling water from a public water system or the use of treated effluent (i.e., "gray water") that otherwise would be discharged to waters of the United States. This addresses the commenter's concerns' about the use of municipal water and gray water and the associated costing.

However, 40 CFR 125.81(b) also provides that "use of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States." The purpose of this provision is to prevent circumvention of the rule by creating arrangements to receive cooling water from an entity that is not a point source. As EPA noted in the preamble to the proposed rule, this approach to regulation of cooling water intake structures controlled by an entity other than the one using the water for cooling is analogous to the joint and several responsibility of industrial users of a privately owned treatment plant for compliance with the terms of an NPDES permit issued for the treatment plant. 65 FR 49,069. EPA believes the approach is legally justified. Id.

Regarding implementation, a regulator could impose requirements under this rule in the NPDES permit of the entity using the cooling water, if it is a point source discharger. That facility would be responsible for entering into formal (e.g., contractual) or informal arrangements with the independent supplier to ensure that the supplier's intake meets the requirements of the rule. (The rule would apply directly to the supplier if the supplier withdraws water used for cooling from waters of the U.S. and it is a point source.)

Comment ID 316bNFR.068.153

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Subject Matter Code MISC

Miscellaneous Comment

Until the Rules Become Final, Existing Guidance and Case Law Should Control

EPA should make clear that, in the interim before a rule becomes final, the proposed rule should not be used as interim guidance. Until a new rule is made, § 316(b) issues should be resolved as directed by the draft 1977 EPA guidance and court and EPA case decisions.

This appears to be EPA's intent. In the preamble EPA says that the proposal is not intended as guidance before the final regulations are promulgated. In the interim, EPA says, the Director should continue to make § 316(b) determinations on a case-by-case basis, applying best professional judgment. 65 Fed. Reg. 49,064 col. 1.

Earlier, to the contrary, EPA had indicated its intent that the final new facility rule could act as guidance for interim permitting decisions for existing facilities. See Declaration of J. Charles Fox in Support of EPA's Motion to Modify Consent Decree, dated July 29, 1999, pp. 23-24, filed in Cronin v. Browner, No. 93 Civ. 0314 (AGS) (S.D.N.Y.) (EPA 1999). The use of the final new facility rule as guidance for existing facility permitting would be inappropriate, for several reasons. First, EPA is still gathering data related to existing facilities, and likely will not have completed its analysis of all relevant existing facility data prior to promulgation of the new facility rule. Therefore, the new facility rule will not reflect appropriate consideration of existing facility data and is inapplicable to existing facility permitting decisions.

Second, even if EPA had all the information it needed, that information will not have been subjected to public scrutiny through the rulemaking process, as the Administrative Procedure Act, 5 U.S.C. §§ 551 et seq. (APA) commands. That there is a good reason for this command is amply illustrated by UWAG's comments, which have brought to light significant omissions and errors in the information on which EPA's proposal is based. The United States Court of Appeals for the District of Columbia Circuit recently confirmed the APA's command in Appalachian Power Co. v. EPA, 208 F.3d 1015 (D.C. Cir. 2000), where the court rejected EPA guidance requiring monitoring that went far beyond any interpretation of an existing rule or law.

Here, EPA has developed a rule specifically limited to new facilities and is required by court order to do a separate rulemaking for existing facilities. It cannot credibly claim that applying this rule to existing sources is in any way an "interpretation" of an existing rule or law. And were EPA to issue a statement that any final new facility rule was entirely optional, non-binding guidance, to be applied or ignored at the permit writer's pleasure, it would do little to inform the permit writer. Instead, it would serve only to spawn lawsuits over the basis for any proposed § 316(b) decision.

Third, one major factor relevant to the development of the new facility rule is location of the CWIS. For new facilities, the permitting authority must evaluate the proposed location in relation to the potentially affected waterbody and its aquatic communities, while taking note of the particular

operational and design characteristics of the proposed facility. This degree of assessment typically is not necessary for an existing CWIS, since fundamental decisions regarding location have already been made.

Fourth, there are fundamental differences between new facilities and existing facilities regarding the engineering feasibility of potential BTA controls. Some existing facilities have design aspects that cannot be adjusted to certain CWIS technologies. Also, existing facilities may have site limitations (e.g., lack of undeveloped space) that render certain CWIS technologies infeasible. New facilities, on the other hand, may be more able to accommodate an adjustment to the proposed CWIS technology.

Fifth, in the case of a proposed new facility, determining whether AEI is likely to occur as a result of operation of the CWIS is a predictive inquiry, requiring tools that often vary from assessment techniques appropriate for evaluating AEI related to an existing CWIS. For example, one means of assessing the potential for AEI from an existing CWIS is to compare pre-operational and post-operational population abundances for species of concern. For new sources, this type of analysis is impossible, and the permitting authority may decide to use predictive models to assess population-level impacts for species of concern.

Sixth, there are significant cost differences between retrofitting new CWIS technologies to existing facilities and designing a new facility to work in concert with a chosen CWIS technology. Costs for existing facilities – as opposed to new facilities – would include, for example, substantial energy penalties for retrofits, which may be significantly higher than for new facilities.

Seventh, EPA recognizes that there are circumstances in which EPA regions or states have made, or are in the process of making, § 316(b) permit decisions – sometimes involving significant study, monitoring, technology, or mitigation components – for existing facilities. EPA should not question or destabilize these decisions or negotiations through this proposed new facility rule. Any potential change to existing facility permits should be made, if at all, in accordance with the provisions of the existing facility rule, and during the normal course of permit renewal.

For the above reasons, permit writers will not be able to adapt the new facility rule requirements to existing facilities, even when appropriate site-specific data are available. Thus, permit writers should use existing guidance (e.g., available precedents, and EPA's draft 1977 § 316(b) Guidance for existing facility permit decisions (taking into account that existing facilities typically are subject to less stringent requirements than new facilities) until promulgation of the final existing facility rule.

UWAG also cautions against use of the proposed new facility rule as guidance for new facility permitting before the rule is finalized. Due to the truncated schedule for development of the new facility proposal, and the many varied options for further rule development presented in the proposal, use of the proposal for any advisory or regulatory purpose would be premature. All options presented in the proposal remain viable until the Agency has had an opportunity to evaluate the public comment record and all relevant data within its purview. Since EPA's current preferred regulatory option may be substantially altered as an outcome of that process, it is not suitable for use as guidance during the pendency of the rulemaking.

EPA Response

EPA agrees that the final new facility rule does not reflect appropriate consideration of existing facilities data and is inapplicable to existing facility permitting decisions. EPA anticipates that existing facilities would have less flexibility in designing and locating their cooling water intake structures than new facilities and that existing facilities might incur higher compliance costs than new facilities. EPA recognizes that existing facilities might need to upgrade or modify existing intake structures and cooling water systems to meet requirements of the type contained in the new facility rule, which might impose greater costs than use of the same technologies at a new facility. EPA also recognizes that retrofitting technologies at an existing facility might also require shutdown periods during which the facility would lose both production and revenues, and certain retrofits could decrease the thermal efficiency of an electric generating facility. In addition, EPA understands that site limitations, such as lack of undeveloped space, might make certain technologies infeasible at existing facilities

For these reasons, EPA specifically states in the preamble that the final new facility rule does not apply to existing facilities including major modifications to existing facilities that would be "new sources" as that term is used in the effluent guidelines and standards program. Furthermore, EPA states that it does not intend that new facility rule or preamble serve as guidance for developing section 316(b) requirements for existing facilities. Permit writers should continue to apply best professional judgment in making case-by-case section 316(b) determinations for existing facilities, based on existing guidance and other legal authorities. EPA will address existing facilities fully in Phase II and Phase III rulemakings.

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Subject Matter Code 12.22

Potential for Additional Measures for Unique Situations (Great Lakes)

The Great Lakes Should Not Be Singled Out for More Stringent Regulation By This Rule

EPA says that there are unique situations, such as the Great Lakes, in which there are site-specific factors that may warrant more stringent requirements, as determined by the Director, to minimize adverse environmental impact. 65 Fed. Reg. 49,086 col. 2. Proposed § 125.84(f) would give the Director authority to address specific factors that lead to the need for additional control measures. EPA also cites Executive Order 13158, 65 Fed. Reg. 34,909 (May 31, 2000), requiring EPA to protect significant natural and cultural resources in the marine environment, including the Great Lakes. 65 Fed. Reg. 49,111 col. 2-3.

EPA's concern over "unique situations" illustrates the point UWAG has been making throughout these comments: for § 316(b) purposes, every site is unique. Rather than create a rigid, one-size-fits-all rule and then riddle it with special exceptions, EPA should provide for site-specific studies and determinations where the applicant chooses not to use the conservative screening criteria.

There is no biological basis for treating the Great Lakes separately. They exhibit the vertical zonation typical of smaller lakes. Because of their large size and depth, the fish communities differ from smaller lakes (Becker 1983). However, these communities are not more sensitive than those found in other lakes. To the contrary, the communities in these lakes are probably less sensitive.

From a fisheries perspective, what sets the Great Lakes apart from most smaller lakes and reservoirs is the presence of large numbers of both native and introduced salmonids (i.e., Pacific salmon, trout, and coregonids, primarily bloater and whitefish) (Becker 1983, Tanner 2000). At first glance it might appear that this unusual resource would need more protective regulations. However, the life history of these species indicates that the opposite is true.

As coldwater species, the adults and juveniles of these species spend much of their time in the offshore cooler water. Thus, for most of the year they are not vulnerable to impingement. Also, most of these species are fall/winter spawners that spawn in relatively deep, often offshore areas (particularly reefs and shoals) (Becker 1983, Tanner 2000). Thus, the larvae of most salmonids are not at particular risk of entrainment.

This assessment is supported by EPA's data. None of the 15 species most commonly impinged is a salmonid (Table 11-8 EEA). Only one salmonid (lake trout) appears in EPA's entrainment table (Table 11-6), it was at a single plant (out of 25 plants on Lake Michigan alone, Kelso and Milburn 1979), and it was entrained in low numbers.

Therefore, given the life history characteristics of the group of fishes of most concern in the Great Lakes, no special level of concern is warranted.

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.068.155

Subject Matter Code	19.1
Submittal of Required Information	

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Revisiting § 316(b) Decisions Upon Permit Reissuance

The proposal would require permittees to reevaluate the § 316(b) study and perform additional ambient monitoring before submitting an application for the reissuance of the permit to establish or reestablish the baseline for the next permit term. 65 Fed. Reg. 49,096 col. 3. During each permit reissuance cycle, the Director would compare the pre-operational ambient data with the post-operational data to evaluate the efficiency of the location, flow, and velocity requirements. 65 Fed. Reg. 49,097 col. 1. The requirements of the proposed rule would have to be implemented upon permit issuance and reissuance. 65 Fed. Reg. 49,101 col. 1, 49,121 col. 3.

At present, EPA guidance allows, but does not require, permit writers to reconsider § 316(b) determinations upon permit renewal and to request new information from the permittee. But it also counsels them to consider whether there is a need for such review or data development, based on changes in the facility or the waterbody, or other new information. See Memorandum from Gail B. Cooper to Joseph J. Zadrassor, Legal Opinion on § 316(b) of the Clean Water Act at 6-7 (Feb. 24, 1982).

UWAG recommends that the new § 316(b) rule should be consistent with § 316(c) (which applies to limits on thermal discharges) by providing that, ordinarily, a § 316(b) determination will be presumed adequate for 10 years, but that permitting authorities may review and, if necessary revise, § 316(b) requirements at the time of any permit reissuance if there is reliable new information that changes to the facility or the waterbody may cause AEI that was not considered when the permit was issued, or indicating that the CWIS is causing AEI that was not considered when the permit was issued.

EPA Response

EPA is establishing a two-track technology-based approach that sets minimum performance requirements for new facilities. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Under Track I, the applicant is only required to submit existing data for use in determining the permit conditions. Only under Track II is the applicant required to perform pre-operational monitoring.

With regards to permit renewals, facilities following Track I would simply need to submit their design and construction plan for review, if required. Facilities under Track II would need to demonstrate comparable performance upon permit reissuance

Under general NPDES regulations, Directors are required to review application requirements and require additional controls as necessary to meet the requirements under § 316(b), regardless of the

time frame of the renewal process.

EPA has chosen not to include a 10-year grace period after implementation of controls because EPA believes that permit authorities (states and territories) should determine when and how to reissue permits under Section 316(b).

Comment ID 316bNFR.068.156

Subject Matter Code	9.2
Types of Environmental Impacts Caused by CWIS	

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There is No Need for Additional Requirements to Regulate Construction Effects

EPA says it is concerned about the environmental impact of construction of new CWIS. 65 Fed. Reg. 49,072 col. 3. These effects are displacement of populations and habitat resulting from the physical placement of a new CWIS, the impact of increased levels of turbidity, and the disposal of materials excavated during construction Id.

The proposed rule includes requirements at § 125.84(f) by which the Director could address construction impacts. Id. Subsection 125.84(f) is the all-purpose provision authorizing more stringent requirements if "reasonably necessary" because of multiple intake structures on the same body of water, seasonal variations in the environment, or regionally important species. 65 Fed. Reg. 49,119 col. 1.

There is no need for this § 316(b) rule to address construction impacts. For one thing, construction impacts are presently handled under § 404, requiring permits for the discharge of dredged or fill material in waters of the United States. In particular, the construction of utility intake structures is permitted by Nationwide Permit 12. 65 Fed. Reg. 12,818, 12,887 (March 9, 2000). This general permit, with the conditions it requires, reflects the federal government's considered judgment that "[t]he terms and conditions of this NWP . . . will ensure that NWP12 will authorize only activities with minimal individual and cumulative adverse effects on the aquatic environment." 65 Fed. Reg. 12,843 col. 3. Hence there is simply no need to address construction effects through § 316(b).

If EPA feels that § 404 is not adequate, it could issue a general permit authorizing the construction of CWISs so long as certain precautions are taken. The § 316(b) rule, which is supposed to deal with entrainment and impingement caused by operation, is not the appropriate vehicle for dealing with temporary effects of construction.

EPA Response

As discussed in section VI.B.1 of the Preamble, EPA believes design and construction technologies to minimize adverse environmental impact are technically available and economically achievable. Further, the language of the section 316(b) requires that the construction of cooling water intake structures reflect the best technology available. With respect to dredge and fill activities, EPA is deferring to requirements under the Clean Water Act section 404 program.

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Subject Matter Code 23.5

Executive Orders

Marine Protected Areas

Executive Order 13158, which President Clinton signed on May 26, 2000, aims to strengthen and expand the national system of "marine protected areas" (MPAs), defined as "any area of the marine environment that has been reserved by Federal, State, territorial, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resources therein." 65 Fed. Reg. 34,909 (May 26, 2000). The "marine environment" in turn is defined as "areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands thereunder." Id.

While the proposed § 316(b) rule recognizes there may be need for consistency with Executive Order 13158 (65 Fed. Reg. 49,111 col. 2-3), it fails to provide any insight into what might be entailed in ensuring such consistency. EPA only notes that "it may be necessary to change the requirements for marine protected areas under this proposal to comply with any future EPA objectives of this executive order (e.g., it may be necessary to prohibit or severely limit cooling water withdrawals from marine protected areas)." 65 Fed. Reg. 49,111 col. 3.

The proposed rule does not give the public adequate notice of, nor does it provide a sufficient foundation for, any changes in the proposal based on Executive Order 13158. The public needs to know and understand EPA's rationale for a proposed rule before it can comment on it, yet EPA indicates it may change the proposed rule based on future regulations implementing the Executive Order. Any future changes to the new facility § 316(b) proposal based on the Executive Order, however, must be subject to public notice and comment.

Notice of a rule change is adequate only if
the final rule is a logical outgrowth of the one proposed. . . . [W]hile the logical outgrowth standard does not require the agency to assiduously lay out every detail of a proposed rule for comment, it does require that the agency . . . publish notice of either the substance of a proposed rule or a description of the subjects and issues covered by a proposed rule. Such a description must provide sufficient detail and rationale for the rule to permit interested parties to participate meaningfully.

Horsehead Resource Development v. Browner, 16 F.3d 1246, 1267 (D.C. Cir. 1994) (vacating EPA rule in part because Agency only gave general notice of a new standard and only proposed individual elements of the standard) (internal citations and quotations omitted).

Merely to state in a parenthetical clause that the Agency may prohibit or severely limit cooling water withdrawals from MPAs is not adequate notice, because it lacks the level of detail needed to allow the public to comment meaningfully. Moreover, EPA has failed to explain why MPAs are particularly sensitive to CWISs. Indeed, the proposed rule never even defines MPAs; instead, it merely gives a general description of "marine environment." 65 Fed. Reg. 49,111 col. 3.

UWAG maintains that, depending on CWIS design and operation, it may be appropriate (i.e., non-adverse) to withdraw water from an MPA. For example, withdrawals from anoxic areas may be appropriate. Thus, EPA's position that facilities located in MPAs should be subject to the most stringent requirements (not to mention the possibility of a blanket prohibition on withdrawals in MPAs) is overbroad and unsubstantiated. EPA has failed to explain the rationale behind its sweeping objection to MPA withdrawals. Because its position is unsubstantiated and quite probably flawed, EPA should revisit this issue and consider allowing withdrawals from MPAs, where the features of a particular site permit.

Finally, in conjunction with the Executive Order, EPA is moving forward with regulatory revisions under § 403 of the Clean Water Act, which addresses Ocean Discharge Criteria. But any regulatory revisions to § 403 are inapplicable to the § 316(b) regulations, because § 403 applies only to discharges, not withdrawals.

Thus, the relationship of the proposed rule to the Executive Order is flawed in several ways. EPA provides no rationale for changing the proposed rule to prohibit withdrawals from MPAs. Not only does the Agency not substantiate the suggestion, the prohibition is overbroad, since some withdrawals from MPAs may not be adverse at all. Finally, the entire discussion of the Executive Order in the proposed rule fails to provide adequate notice because the Agency has not defined "marine protected areas."

EPA Response

Any requirements pursuant to section 403 are addressed by the regulations implementing section 403. Any potential revisions to those regulations are outside the scope of this rule.

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Subject Matter Code CP

Comment Period

UWAG Has Not Had Adequate Opportunity To Analyze The Rulemaking Record

UWAG has not had time to do a thorough analysis of the rulemaking record. However, the references EPA has cited in support of the proposed rule raise questions about whether EPA actually relied on data or scientific literature for its conclusions. For example, a review of the Cost Research Report (CR) and the EEA reveals the following:

*The CR has only 32 documents cited as references. Of those, only 3 are listed in the record (1-1026-TC, 1-5069-PR, and 1-5070-PR).
*All of the 32 documents cited as references in the CR report also appear as references in the EEA report.
*The EEA report lists 212 documents as references. Of these, 147 documents are record documents, while 65 are references cited but not listed in the record.
*One UWAG document (1978 Thermal Control Cost Factors; Chapter 2 – Report on Capital Costs of Closed-Cycle Cooling Systems; prepared by Stone & Webster) is cited in both the CR and EEA but not listed in the record.

These irregularities in the rulemaking record, or at least in EPA's references to it, suggest three things. First, there has not been enough time in the public comment period to analyze the record fully. Second, EPA should issue a Notice of Data Availability to make clear what documents are in the rulemaking record and to allow the public to comment on them. Third, EPA should explain what data, scientific papers, or other information is the basis of each of the Agency's important findings.

UWAG's opportunity to comment on this critical rulemaking has been hampered by several Agency actions relating to the rulemaking record. UWAG submits that these actions denied UWAG effective administrative due process. Unless this deficiency is corrected, future Agency action on the proposed rule may be subject to legal challenge.

Most serious was EPA's reliance on the proprietary NEWGen database, which EPA used as a key source for determining the anticipated economic impact of the rule on the steam electric generating sector. See 65 Fed. Reg. 49,101-02. EPA felt that it could not make that database part of the record because of its proprietary nature, even though it relied on the database to (1) identify planned facilities that will be subject to the rule (substantially fewer than UWAG or EEI has identified); (2) obtain limited facility-specific intake information <FN 109> for these planned facilities; and (3) make general characterizations of alleged industry trends (e.g., "the NEWGen sample set shows a trend away from the use of surface cooling water," 65 Fed. Reg. 49,108 col. 2).

UWAG pointed out to EPA that lack of the database was hampering its review because it was impossible to critique EPA's decisions based on the database. In response EPA first supplied contact information for the owner of the database and told UWAG it was free to purchase access rights.

When UWAG again requested that the Agency make the database available, EPA, on September 25 (46 days into the 90-day comment period) provided limited summary information about how it used the database to reach its conclusions about the number of facilities potentially affected by the rule. However, this supplementary information was insufficient to evaluate (1) the accuracy of the NEWGen data relied on by EPA, (2) the completeness of the database, and (3) whether EPA's extrapolation from the database was an accurate interpretation of its contents. UWAG believes the rulemaking record is deficient because the Agency did not make the database available to the public.

Additionally, EPA did not provide certain data that would have allowed for efficient, meaningful evaluation of the analysis of the potential environmental benefits of the proposal. Chapter 11 of the EEA has tables summarizing impingement/entrainment data by species and cites numerous studies (107 studies of 98 facilities, according to EPA) as the source documents for each table. See, e.g., Tables 11-2, 11-3, 11-5, 11-8, 11-10, 11-11, 11-12, and 11-13. UWAG requested that EPA provide background information about how it compiled the summary tables from the sources, but EPA declined. Therefore, UWAG was not able to analyze the environmental benefits information in detail by the end of the comment period. This is a task that goes to the heart of whether the proposed rule is justified by the anticipated additional environmental protection it will provide.

Also of concern to UWAG is EPA's failure to include in the record large numbers of documents submitted by UWAG and other industry representatives. On September 14, 2000, UWAG sent EPA a list of 16 key UWAG documents presented to EPA during the development of the § 316(b) rules but not included in the record<FN 110>. Although EPA, on September 25, belatedly added six documents to the record, it refused to add the others. Thus, UWAG must submit the substance of those documents, once again, for the record.

Footnotes

109 The site-specific information derived from the database, however, was limited. EPA did not, for example, determine the size of the littoral zone at each proposed facility.

110 See Appendix K, which includes a letter from Kristy A. N. Bulleit, on behalf of UWAG, to Geoffrey H. Grubbs, Director, EPA Office of Science and Technology (Sept. 14, 2000). UWAG is resubmitting these documents for the record.

EPA Response

EPA disagrees that these concerns required that EPA extend the comment period. See response to comment 316bNFR.056.001. EPA also further extended the opportunity to comment by publishing a Notice of Data Availability.

Nevertheless, in response to the commenter's earlier request, EPA placed in the docket additional information regarding the data EPA used, in part, to determine which new facilities would bear costs to comply with a new facility rule. With respect to the NewGen database, EPA ultimately provided the data that the owner of the database would allow for free access. NewGen is a proprietary database owned by Resources Data International, Inc. (RDI) that is available to others (albeit at a cost). EPA provide all the information necessary to purchase the database if the commenter wanted more information. EPA believes that the data it provided was sufficient to evaluate and understand how EPA used the information to develop its profile of planned new electric generators. As for the validity of the database, EPA evaluated a number of databases and determined that the NewGen database was the best because it was the most comprehensive and up to date source of information

on planned and new electric generating facilities. EPA placed this information in the docket during the comment period. EPA believed the time remaining in the comment period was sufficient for review of this additional, 17-page document.

EPA placed many of the materials in the docket that the commenter submitted. However, most of the documents that EPA did not placed in the docket relate to the draft survey questionnaires that EPA developed to gather information from regulated entities to support the forthcoming existing facility proposal. EPA typically does not include comments on draft survey questionnaires in its rulemaking records.

EPA did publish a notice of data availability (NODA) on the proposed new facility rule in the Federal Register on May 25, 2001. 66 Fed. Reg. 28853. The notice presented a summary of the data EPA had received or collected since proposal, which included documents that the commenter had sent to EPA as part of their comments, as well as technical documents that the commenter submitted after the comment period closed for the proposed rule.

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Subject Matter Code 23.2

Facility Information Collection Burden Estimates

The ICR Lacks Practical Utility and Underestimates the Substantial Burdens Imposed by the Proposal

As noted in the Introduction, UWAG intends these comments to address both the proposed rule and the proposed information collection request (ICR) that accompanies the rule (ICR No. 1973.01). UWAG finds the ICR unjustified because the information to be gathered lacks practical utility and because the burdens imposed are substantial.

The ICR would permit EPA to require facilities subject to the rule to provide the following types of information:

*Source water physical data for evaluation of potential impact to the waterbody in which the intake structure is placed;
*Intake structure data consisting of intake structure design and facility water balance diagram to evaluation the potential for impingement and entrainment of aquatic organisms;
*Baseline ambient biological data including a sampling plan explaining how the data will be collected;
*The BBC (described above in Part XI);
*Flow, velocity, and recirculation data to demonstrate compliance with the flow, velocity and recirculation requirements (see proposed §§ 125.86, 125.87, 65 Fed. Reg. 49,119-20; and
*An implementation plan for additional design and construction technologies to ensure compliance with the applicable requirements of the rule (see proposed § 125.86, 65 Fed. Reg. 49,120).

ICR, p. 2.

The practical utility of the ICR should be determined based on the usefulness of the data to be gathered and submitted to EPA. Assuming that EPA's assessment of the number of facilities potentially subject to the rule is correct, it is unlikely that the data will be of much benefit in minimizing AEI, because the few facilities subject to the rule will not have a significant environmental impact. EPA projects that the proposed rule will affect a very few facilities – only 40 during the period 2001-2020. 65 Fed. Reg. 49,102 col. 1. Moreover, EPA arrives at this conclusion by conceding that "taken together, the trend toward combined-cycle generating technologies, which have small cooling water requirements per unit of output, and the trend away from the use of surface cooling water result in a low projected number of regulated facilities, despite the expected expansion in new generating capacity." 65 Fed. Reg. 49,108 col. 2. If very few facilities are affected by the rule, then gathering data on the impacts of those facilities will be of very little practical utility, in terms of the ultimate environmental benefit.

If, on the other hand, EPA has underestimated the number of facilities that will be subject to the rule (as UWAG believes it is has)<FN 111> then EPA has grossly underestimated the cumulative burdens, both to the regulated community and to state regulators, associated with the rule. As already noted, EEI's analysis concludes that 209 facilities will be subject to the rule instead of the 40 EPA

predicts. Thus, the costs of compliance with the ICR could be much higher than EPA supposes. EPA should revisit its burden estimates in light of the EEI data. <FN 112>

Even if EPA is right about the number of affected facilities, it nonetheless severely underestimates the costs of complying with the ICR. For example, on a per-facility basis, the BBC may be an order of magnitude more expensive than the $32,000 estimated by EPA, especially where the intake is to be located in an estuary or other complex environment. See Part XI. Also, EPA's estimate of $2,372 for labor costs (assuming 85 hours) to prepare the "additional technology implementation plan" is far below what would really be required. ICR, p. 39.

Footnotes

111 EPA appears to have "front-loaded" its projection of the number of affected facilities for purposes of the ICR, since the ICR states: "EPA anticipates that 22 new facilities will fall within the scope of the proposed rule during the first three years after promulgation." ICR, p. 33. If 22 facilities fall within the scope of the rule in its first three years, then apparently EPA assumes that only another 18 (for a total of 40) facilities will be subject to the rule during the sixteen-year period from 2004-2020.

112 EPA erroneously claims, as the justification for imposing these burdens, that the consent agreement entered into in Cronin v. Browner, 93 Civ. 0314 (AGS) (S.D.N.Y) compels the Agency to "propose and finalize regulations that implement section 316(b) of the CWA by specified dates." ICR, p. 42. That consent agreement only requires EPA to propose, and take final action on, § 316(b) rules. Final agency action can be a "no action" decision.

EPA Response

EPA has a practical utility for the data collection requirements in the final rule. In general, the information requested will facilitate evaluation of potential impacts to the source water bodies and their associated aquatic communities and to demonstrate that facilities have implemented the appropriate technologies to minimize adverse environmental impacts from CWISs. Permit writers will use the information to identify species at risk or other potential concerns that might necessitate the specification of additional permit limits or special conditions. In addition, EPA believes the information is similar in scope and detail to that collected under other NPDES programs, including previous 316(b) efforts.

At proposal, EPA estimated for the period 2001-2020 that 40 in-scope new electric generating facilities and 58 in-scope new manufacturing facilities, for a total of 98 facilities subject to the proposed rule. In response to commenters' concerns about the accuracy of this estimate, EPA used newly available data, as documented in the NODA and the preamble to the final rule, to update and expand its research regarding the number of new facilities affected by the final rule. The result of EPA's updated estimate is a net increase of 23 new facilities, for a total of 121 new facilities from 2001 to 2020. Additionally, EPA has revised its projection of the number of affected facilities for the three-year ICR period from 22 for the proposal ICR to 18 for the ICR for the final rule. EPA believes that, given the evidence of potential adverse environmental impacts from CWISs as discussed in Sections III and VI.B of the preamble to the final rule, gathering data on the environmental impacts of this number of facilities is justified.

In response to commenters' concerns about the accuracy of cost estimates for the information collection requirements (ICR) of the proposed rule, EPA has revised the ICR as described in Section X.B of the preamble to the final rule. Specifically, EPA's estimate of labor costs have been revised

with a resulting increase in costs for the Design and Construction Technology Plan to $2,902. In addition, requirements for the Baseline Biological Characterization have been revised as described in Section VI.G of the preamble, and burden and cost estimates for these requirements have been adjusted accordingly. In general, the BBC requirements have been reduced for facilities choosing track I, since these facilities may use existing information and will not be required to conduct pre-application monitoring. Facilities choosing track II will be required to conduct more rigorous monitoring. The BBC cost associated with track II will be significantly greater than that for track I, but EPA believes that the monitoring requirements for this option will allow facilities to demonstrate the effectiveness of alternative technologies in reducing impingement and entrainment. For additional detail on the burdens and costs associated with the information collection requirements of the final rule, see the Information Collection Request for the 316(b) Final New Facility Rule, October, 2001.

Comment ID 316bNFR.068.160

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Subject Matter Code EXIST

Existing Facility Rule

Above all, decisions made in this rulemaking for new facilities should not be allowed to prejudice decisions yet to be made in the rulemaking for existing facilities. Much different considerations govern existing facilities, and the rule for new facilities should not be taken as “precedent” for that other rulemaking.

EPA Response

See response to comment 316bNFR.064.002 and the preamble to today's rule.

Comment ID 316bNFR.068.300

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Subject Matter Code 21.0

Cost/Benefit Analysis

Economic Disadvantages of EPA's Proposed National Standards Approach
The major economic disadvantage of the national approach is that uniform requirements would be wasteful. The wastes would occur in two ways:

1. National standards would result in greater costs than necessary to achieve a given level of environmental protection; and
2. National standards would produce fewer environmental gains than possible for a given level of resource expenditures.

These disadvantages flow from the large differences in the costs and benefits across facilities that are ignored by the national approach. This section summarizes the variability in costs and benefits across sites and provides examples to illustrate the limitations of the national standard approach.

1. Sources of Variability Across Sites in the Benefits and Costs of a Given Fish Protection Technology

Comments provided in UWAG 2000 supply evidence of the variability in costs and benefits across different facilities. These differences can be summarized as follows:

a. Benefit Variability

Installing a given technology at a new facility can result in vastly different benefits at different sites because of differences in the following factors:

Waterbody Characteristics
-hydrology
-zone of influence of intake
-temperature
-turbidity
-natural debris loading
-meteorological factors, such as ice formation and storm patterns

Biological Characteristics
-life history of species affected by the CWIS
-habitat preferences
-behavioral patterns

Plant Characteristics
-operational patterns/schedule, including planned outages
-likelihood of sedimentation build-up in front of intake
-maintenance/repair needs for all parts of intake structure

Those factors may vary in importance/relevance depending on individual site factors. The net result is that the environmental benefits of installing a given fish protection technology will differ substantially across different sites.

b. Cost Variability

The costs of adopting a given technology can also differ substantially depending upon the specific facility and site. Perhaps the most straightforward example is the case of a closed-cycle cooling water system, a technology that figures prominently in EPA's proposed national approach. (New facilities in many locations would have to reduce water intake flow to a level commensurate with the closed-cycle cooling system under EPA's proposed framework, as summarized in 65 Federal Register 49077.) The costs of this technology can vary depending on cooling water requirements, site conditions for construction, local atmospheric conditions, power costs in the regional electricity system, and the plant characteristics listed above as affecting the benefits.

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

Comment ID 316bNFR.068.301

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Subject Matter Code 21.0

Cost/Benefit Analysis

The Proposed Uniform National Approach Would Waste Resources

The national technology minimum approach proposed by EPA largely ignores the variability in both the costs and the benefits of adopting specific cooling water intake structure("CWIS") technologies—or technology performance standards—at different locations. Although their approach provides some variability in control requirements, the requirements would be uniform for large categories of potential locations. This approach does not appropriately consider the specific costs and benefits when determining which technology to install at specific locations. The national approach leads to three inefficient results:

1. First, the proposed approach would produce smaller fish-protection and other environmental benefits for a given level of costs;
2. Second, the proposed approach would impose higher costs than are necessary to achieve a given level of fish protection and other environmental benefits; and
3. Third, the proposed approach would not provide the appropriate incentives to locate facilities in areas with fewer environmental impacts.

It is useful to illustrate the disadvantages of the uniform national approach with some examples. The first example provides a benchmark for the comparisons by illustrating how BTA technologies would be set to maximize net benefits for two plants under the assumption that both plants have the same costs and benefits. This example assumes that BTA is based upon a benefit-cost comparison. (As discussed in Chapter III, the proposed EPA approach to setting BTA is not based upon cost-benefit comparisons; thus, the economic impacts of EPA's approach would be even worse than illustrated in this chapter.) The second example illustrates the drawbacks of ignoring variability in the benefits across different sites. The third example illustrates the disadvantages of ignoring differences in the costs across sites.

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

Comment ID 316bNFR.068.302

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Subject Matter Code 21.0

Cost/Benefit Analysis

National Uniform Technology Standards Would Not Waste Resources if the Costs and Benefits of Alternative Technologies Were the Same for All Facilities

National technology based requirements implicitly assume that the benefits of applying the technology are the same regardless of the site, within broad water body and location categories. Put another way, the uniform approach at best tends to focus on the average values for costs and benefits, rather than consider the wide range of costs and benefits dependant upon the characteristics of the individual facility.

Table 1 provides an illustration of the costs and benefits of three technologies that could be applied in one of the broad groups identified in the EPA proposed approach (e.g., estuary or tidal river). The illustrative technologies represent increasingly expensive means of reducing fish losses at two identical facilities. The table shows the cost of applying each of the three technologies as well as the fish protection (and other) benefits if each of the three technologies were employed. The table also illustrates the incremental cost and incremental benefit of each of the technologies. Incremental cost is defined as the added cost of each technology relative to the previous one. For example, the incremental cost of Technology 2 is $50 million, the difference between the total cost of Technology 2 and the total cost of Technology 1 ($75 million minus $25 million).

Table 1. Illustrative Costs and Benefits of Alternative CWIS Technologies at Two Facilities with the Same Costs and Benefits ($millions)

FACILITY A

	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	25	25	50	50	25
2	75	50	125	75	50
3	150	75	175	50	25

FACILITY B

	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	25	25	50	50	25
2	75	50	125	75	50
3	150	75	175	50	25

The benefit-cost criterion implies that the choice should be based upon maximizing the net benefits, i.e., benefits minus costs. Net benefits are maximized for Technology 2, which is predicted to produce a net benefit of $50 million dollars for each of the two facilities. Although the more expensive Technology 3 has benefits ($175 million) that are greater than costs ($150 million), net benefits would only be $25 million, substantially less than the net benefits of Technology 2.

The rationale for stopping at Technology 2 can also be explained in terms of the incremental costs and incremental benefits of Technology 3 relative to Technology 2. The table shows that the incremental cost is $75 million and the incremental benefit is only $50 million of adopting Technology 3 relative to Technology 2. This illustrates the general rule that a more expensive technology would increase net benefits if its incremental benefits are greater than its incremental costs.

The point of including two facilities in Table 1 is to illustrate that if the costs and benefits are the same for all facilities, the national standards approach is adequate. The following sections illustrate the disadvantages of the national approach under the more realistic cases in which the benefits and the costs differ.

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

Ignoring Variability in Benefits Would Waste Resources and Ignore Opportunities to Obtain Environmental Benefits

The disadvantages of the uniform national approach can be illustrated by considering an example in which the benefits of applying each of the technologies differs for the two facilities. As noted above, applying the same technology can have vastly different benefits depending upon a host of factors. The benefits would be much greater, for example, if the technology were applied in an area where there is a high risk of adverse environmental impact (AEI) rather than in an area with little possibility of AEI.

Table 2 shows hypothetical estimates for the two facilities when this benefit variability is taken into account. Facility A represents a "low benefit" situation. This facility might be one located in an area with little risk of AEI, and thus the benefits from applying expensive fish protection technology are relatively small. Under EPA's uniform technology approach, Technology 2 would be required at Facility A. That requirement would waste resources. The added cost of Technology 2 relative to Technology 1, which is equal to $50 million ($75 million minus $25 million) is greater than the added benefit of applying Technology 2, which is only $40 million ($70 minus $30 million). Put another way, Facility A would be over-controlled under the uniform technology requirement.

Table 2. Illustrative Costs and Benefits of Alternative CWIS Technologies at Two Facilities with the Same Costs but Different Benefits ($millions)

FACILITY A (Low Benefit)

	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	25	25	30	30	5
2	75	50	70	40	-5
3	150	75	120	50	-30

FACILITY B (High Benefit)

	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	25	25	100	100	75
2	75	50	210	110	135
3	150	75	370	160	220

A uniform technology requirement also would prevent the opportunity to focus greater controls in "high benefit" areas. Facility B represents a "high-benefit" situation. This facility, for example, could be located in an area with substantial risk of AEI, and thus the benefits of adding fish protection technology to the cooling water intake system would be substantial.

Under EPA's uniform technology approach, Technology 2 also would be required at Facility B. That requirement would limit opportunities. The added benefit of Technology 3 of $160 million is greater

than the added cost of $75 million, yielding a change in net benefits of $85 million from technology 2 to technology 3. That net benefit is foregone under the uniform technology approach.

In sum, ignoring variations in benefits tends to waste resources by requiring the same technology at all sites within a broad geographic area. The result is that resources are not targeted where they provide the greatest environmental benefits.

* Facilities in “low benefit” areas would tend to be over-controlled; and
* Facilities in “high benefit” areas would tend to be under-controlled.

Both situations lead to wasted opportunities to maximize the net benefits of regulations on cooling water intake structures at new facilities.

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

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Subject Matter Code 21.0

Cost/Benefit Analysis

Ignoring Variability in Costs Would Waste Resources and Ignore Opportunities to Obtain Environmental Benefits

Facilities also differ substantially in the costs of applying a given technology. Table 3 shows the results of applying the uniform technology approach at two facilities that differ in the costs of control. Facility A represents a relatively high cost situation. Requiring Technology 2 at Facility A would waste resources because the incremental costs for Technology 2 of $105 million are substantially greater than the incremental benefits for Technology 2 of $75 million.

Table 3. Illustrative Costs and Benefits of Alternative CWIS Technologies for Two Facilities with Different Costs and the Same Benefits ($millions)

	FACILITY A (High Cost)				
	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	45	45	50	50	5
2	150	105	125	75	-25
3	300	150	175	50	-125
	FACILITY B (Low Cost)				
	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	10	10	50	50	40
2	60	50	125	75	65
3	90	30	175	50	85

Facility B is a relatively low cost facility. Requiring Technology 2 at Facility B would generate substantial net benefits, equal to $65 million. But the uniform requirement ignores the opportunities to exploit the low costs of control at Facility B by applying more stringent controls. Applying Technology 3 to Facility B would lead to net benefits of $85 million, $20 million more than the net benefits under Technology 2.

In sum, ignoring cost variations also tends to waste resources and avoid opportunities to obtain environmental improvements. Resources are not targeted where they provide the greatest environmental gains.

* High-cost facilities would tend to be over-controlled; and
* Low-cost facilities would tend to be under-controlled.

As with the situation in which benefit differences are ignored, ignoring cost variations leads to wasted opportunities to increase the net benefits from regulations on cooling water intake from new facilities.

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

Economic Advantages of Site-Specific Approach

Determining the appropriate BTA technology on a site-specific basis avoids the disadvantages of the national technology-based approach. Under a site-specific approach, control resources are focused where they provide the greatest benefits. In addition, opportunities to obtain cost-beneficial environmental gains can be exploited.

This section illustrates the advantages of the site-specific approach. The examples continue to assume that requirements are based upon a benefit-cost test. (As discussed in Chapter III, the test that EPA proposes for BTA is not based upon benefit-cost comparisons and, indeed, is seriously deficient from an economic perspective.)

1. By Taking Benefit Variability Into Account, the Site-Specific Approach Increases the Net Benefits of Controls

We can use the previous examples to illustrate the gains from taking benefit variability into account. Table 4 illustrates the same three technologies for Facility A ("low benefit") and Facility B ("high benefit") under the assumption that the costs are the same when a given technology is applied to either facility. Because of differences in the benefits when a technology is added to the two facilities, as noted above, the appropriate technology choice is very different. Under the site-specific approach, Facility B ("high benefit") would have the most expensive technology while Facility A ("low benefit") would have the least expensive technology. Under this hypothetical example, the technology that would be chosen as the national uniform technology would not be appropriate for either of the two facilities.

Table 4. Illustrative Costs and Benefits of Alternative CWIS Technologies for Two Facilities with the Same Costs but Different Benefits ($millions)

Table 4 shows the gain from the site-specific approach relative to the uniform national approach. Under the site-specific approach, the overall costs are greater than if the two plants were both subject to the uniform technology; the total cost for the two facilities would be $175 million under the site-specific approach, compared to $150 million under the national uniform approach. But the benefits of the site-specific approach would be substantially greater, leading to an increase in net benefits from $130 million under the national uniform approach to $225 million under the site-specific approach.

FACILITY A (Low Benefit)

	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	25	25	30	30	5
2	75	50	70	40	-5

3	150	75	120	50	-30

FACILITY B (High Benefit)

	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	25	25	100	100	75
2	75	50	210	110	135
3	150	75	370	160	220

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

Comment ID 316bNFR.068.306

Subject Matter Code	21.0
	Cost/Benefit Analysis

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By Taking Cost Variability Into Account, the Site-Specific Approach Increases the Net Benefits of Controls

Differences in the cost of control across sites leads to additional gains from the site-specific approach. Table 5 shows the case in which benefits are the same for the two facilities but costs vary substantially between the two facilities. Under the site-specific approach, Facility A ("high cost") would have the least advanced technology while Facility B ("low cost") would have the most advanced technology.

Table 5. Illustrative Costs and Benefits of Alternative CWIS Technologies for Two Facilities with Different Costs but the Same Benefits ($millions)

	FACILITY A (High Cost)				
	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	45	45	50	50	5
2	150	105	125	75	-25
3	300	150	175	50	-125
	FACILITY B (Low Cost)				
	Costs		Benefits		Net
Technology	Total	Incremental	Total	Incremental	Benefits
1	10	10	50	50	40
2	60	50	125	75	65
3	90	30	175	50	85

As in the case with varying benefits at the two facilities, the cost-varying case leads to different overall costs and benefits than under the uniform approach. Under the site-specific approach, both overall costs and overall benefits are lower than under the uniform approach. But the net benefits are much greater under the site-specific approach; net benefits are $90 million under the site-specific approach, compared to just $40 million under the national uniform approach.

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

Comment ID 316bNFR.068.307

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Subject Matter Code 21.0

Cost/Benefit Analysis

Summary of Illustrative Gains of the Site-Specific Approach

The full advantages of the site-specific approach are evident when the effects of both benefit variability and cost variability are taken into account. Table 6 summarizes the effects of applying the site-specific approach and the national uniform approach. The total net benefits of the national and site-specific approaches are the same when there is no variation in costs and benefits across facilities. But the illustrative net benefits under the two approaches are substantially different when benefit variation and cost variation are taken into account.

Table 6. Illustrative Net Benefits for Two Facilities Under National and Site-Specific Approaches

	Total Net Benefits		
Approach	No Variation	Benefit-Variation	Cost-Variation
National	100	130	40
Site-Specific	100	225	90

These examples illustrate that the site-specific approach is superior to the national approach except under a case in which all facilities have identical costs and benefits. When the costs and benefits vary—as they inevitably will—the site-specific approach provides higher net benefits than the national approach. Put another way, the national "one sized fits all" approach would waste resources by not targeting control expenditures where benefits are relatively high and costs are relatively low.

EPA Response

Comments 316bNFR.068.034 and 316bNFR.068.300 to 307 were treated as a single comment with regard to issuing a response. See response to comment 316bNFR.068.034 for a response to the issues raised in this comment as well as issues raised in the accompanying comments.

Comment ID 316bNFR.068.308

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Subject Matter Code 11.0

Best Technology Available-Location

The Site-Specific Approach Also Leads to Appropriate Incentives to Locate Facilities Where Impacts are Low

The EPA at various points in its proposal notes the importance of providing incentives for facilities to locate outside areas where there is a high risk of adverse environmental impact. The national approach sets different requirements for facilities in different locations, which would discourage new facilities from locating where standards are relatively stringent. The proposed national requirements are most stringent for facilities in tidal rivers, estuaries and the "littoral zone" of freshwater rivers, lakes and reservoirs (65 Federal Register 49083).

Although setting different standards for facilities located in different locations provides some of the advantages of the site-specific approach, the requirements are too crude in light of the large differences in benefits among facilities located within the broad areas in the proposed regulations. In contrast, a site-specific approach provides the appropriate incentive for facilities to locate outside areas of important biological activity.

Note that the feasibility of locating facilities outside areas more likely to have adverse environmental impact depends upon the importance of other factors that go into siting decisions for new facilities. As EPA acknowledges, it is sometimes not possible to locate facilities outside of areas likely to experience adverse environmental impacts (65 Federal Register 49083). Many factors enter into siting decisions, including wage scales and other aspects of local labor markets, access to raw materials, and state and local taxes. In the case of electric generating facilities, access to natural gas pipelines for input supplies and proximity to electricity transmission lines are also important siting considerations.

The potential inflexibility of the national approach also could lead to unintended effects on the electricity prices and the reliability of the electricity system. Stringent and inflexible requirements could have the effect of creating "zoning restrictions" for electric power plants and other affected facilities. Indeed, the cumulative effect of 316(b) regulations and other policies—such as wetlands restrictions—could result in significant limitations in the ability to site new electric generating facilities. Such limitations could lead to higher electric rates and possible reductions in the reliability of the overall electricity system. These electric sector impacts could in turn affect overall growth in the U.S. economy (see, e.g., National Research Council 1986).

Because siting decisions can be complicated—and because the energy and other benefits of new facilities are important—it is important that the 316(b) regulations provide sufficient siting flexibility. At the same time, the regulations should reflect the disadvantages of locating facilities where these is a high risk of adverse environmental impact. The site-specific approach would provide such a balance.

EPA Response

The final rule takes a more flexible approach. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.068.309

Subject Matter Code	10.05
Limitations of Current 316(b) Permitting Approach	

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EPA's Criticisms of the Site-Specific Approach Are Not Justified

EPA argues that it is proposing this new approach "based in large measure on the Agency's experience in attempting to implement section 316(b) on a wholly site-specific basis" (65 Federal Register 49079). The following are the alleged difficulties of the existing case-by-case approach mentioned by EPA in the proposed rule.

* Administrative and information costs. EPA argues that considerable resources have been expended by regulatory authorities and industry to develop case-by-case information.
* Disincentive to consider new technology. EPA claims that the information costs have resulted in reluctance to reconsider permit conditions in light of new technologies.
* Inconsistency. EPA argues that the case-by-case approach "might result in permitting decisions that are less consistent than they would be if national requirements were in place." (65 Federal Register. 49079)
* Predictability. EPA argues that "[t]he case-by-case approach results in less predictability regarding what is or may be required for a particular facility, which makes planning difficult for industry and leaves regulatory agencies uncertain about the appropriate requirements for particular water bodies or facilities." (65 Federal Register. 49079)

None of these alleged difficulties provides a persuasive economic rationale for preferring EPA's proposed national approach to the site-specific approach.

EPA Response

See response to 316bNFR.068.025. EPA believes that the record strongly supports the determination that the industries affected can afford this rule. The cost to revenue ratio for the Track I technologies are 0.5 percent or less for most (112) facilities. The cost to revenue impacts exceed 3 percent for only 3 facilities.

The criticisms of the site-specific approach in the proposed rule are not put forth as economic justifications. The record for the final rule indicates the requirements of the rule are economically practicable. In addition, the two-track approach allows both a site-specific permitting alternative and a fast-track permitting alternative.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

The Administrative Costs of the Site Specific Approach Are Justified by Better 316(b) Decisions

EPA claims that the historical case-by-case approach requires significant resources on the part of both regulatory authorities and industry (65 Federal Register 49079). The Agency, however, does not provide any specific information on the administrative costs that have been incurred under the case-by-case approach. Nor does EPA compare the administrative costs of the case-by-case approach with those of the proposed national minimum standards approach (which includes the potential site-by-site evaluation of alternative and supplementary standards).

EPA's concern for administrative costs is justified. Resources spent analyzing the costs and benefits of regulatory alternatives at different sites represent real resource costs. But the objective of efficient and effective regulation is not to minimize administrative costs but rather to maximize the net benefits of regulation. Resources spent to avoid inappropriate decisions—including regulations that are inappropriately stringent in some cases and inappropriately lax in other cases—can represent money well spent. Indeed, the field of decision analysis provides guidelines for determining the value of information collection (see. e.g., Raiffa 1968). The value of information depends upon whether it would influence the decision and the significance of the decision (see Stokey and Zeckhauser 1978).

Site-specific information for 316 (b) decisions may have considerable value because of the wide range of costs for possible fish protection technologies—ranging from relatively simple screens to expensive closed-cycle cooling systems—and the equally wide range of possible benefit circumstances. Collecting information that allows the technology to be tailored to the site conditions thus will pay off in the form of higher net benefits for the decisions that are ultimately made in 316(b) permits. Later in this chapter we illustrate how the site-specific approach might be modified to take administrative costs into consideration. That section also discusses the limitations of EPA's proposed approach to including some site-specific variability in its regulations.

EPA Response

The two-track approach in the final rule balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This approach allows the facility to choose whether to pursue site-specific permitting, and to balance this against the cost and certainty of Track I. EPA has described why it is using impingement and entrainment as the metric for performance in Track I and as the primary metric for performance in Track II elsewhere in this comment response document.

Comment ID 316bNFR.068.311

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

The Site-Specific Approach Would Likely Provide Greater Opportunities to Consider New Technology Over Time Than the National Approach

EPA argues that the administrative costs of the site-specific approach have made permit writers reluctant to revisit 316(b) permit conditions in light of new technology. The Agency contends that the reluctance is a "significant concern." (65 Federal Register 49079)

EPA provides no information in the Preamble to support this concern. Thus, it is difficult to assess this argument. In general, the site-specific approach should provide greater incentive to encourage new technology over time than the uniform national approach. Requirements that appear to be based on particular technologies tend to lock in particular technologies and provide little incentives to modify controls in light of improvements (see Portney 1990). Having once put in the technology required under the minimum national requirements, facilities are unlikely to look for more effective or efficient methods. The incentives for long-run innovation of BTA technologies also would be diminished, since market opportunities would be limited to all but a select few technologies. In contrast, a site-specific approach would provide the opportunity for a periodic review of the costs and benefits of technologies. Although owners may not have incentives to search for more stringent options, the need to review literature on current control options and their costs would provide a mechanism for new developments to be evaluated and considered in the permit renewal process.

EPA Response

The discussion of the burden of the existing approach to site-specific permitting in the proposed rule is based on EPA experience supporting the permitting process, EPA knowledge of that process, and discussions with experienced permit writers. EPA agrees that fostering continuing innovation is a challenge regardless of the approach taken. In the final rule, EPA has provided both a fast-track (Track I) and a site-specific compliance alternative (Track II). See response to 316bNFR.068.310.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

The Site-Specific Approach Could Provide Greater Economic Consistency Than the Uniform National Approach

EPA argues that the historical case-by-case approach may result in less consistent permitting decisions than the national requirements of the EPA proposed approach. (65 Federal Register 49079) The Agency does not specify its definition of consistency. If consistency means subjecting facilities to the same regulatory requirements regardless of their individual situations, EPA's contention is certainly true. But such consistency seems of little value and would only reflect the lack of appropriate flexibility in the national approach.

The site-specific approach would be more consistent than the national approach if consistency is measured in economic terms, i.e., as effective and efficient regulation. The site-specific approach would allow permit writers to take into account the individual circumstances of individual facilities. Although one could not be certain that all permit writers would use appropriate economic criteria—as outlined in Chapter III of this report—the site-specific approach at least offers the possibility of deciding on controls at individual facilities in an economically rational manner.

EPA Response

The two-track approach in the final rule balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This approach offers both a fast-track alternative and a site specific alternative. It also allows the facility to consider the cost versus benefit of pursuing site-specific permitting, and to balance this against the cost and certainty of Track I. EPA believes this approach will be both effective and efficient, as well as consistent with the controlling statutory provisions. If by "economically rational" the commenter insists that cost/benefits be balanced, EPA disagrees that that is required in a technology-based rule. See response to comments 316bNFR.206.014, 068.007 and 068.008. EPA believes that for new facilities, where the costs of the rule are without question economically achievable and the requirements are current practice at many new facilities, EPA should not in essence require the permit authority to engage in a demonstration of equivalent monetized benefits at the new facility. EPA may make a different decision for existing facilities where retrofit costs make the affordability of certain controls difficult.

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

Any Greater Predictability of the National Uniform Approach Would Reflect Its Lack of Flexibility Compared to the Site-Specific Approach

The EPA argues that the case-by-case approach results in less predictability regarding what is required for a particular facility. This lack of predictability, according to EPA, "makes planning difficult for industry and leaves regulatory agencies uncertain about the appropriate requirements for particular water bodies and facilities." (65 Federal Register 49079)

While a national uniform approach may lead to greater predictability—because the required technologies would be identified in the national requirements—such predictability would come at the cost of flexibility. Indeed, predictability seems another term to describe the inflexibility of the national technology approach proposed by EPA for new sources. In contrast, a site-specific approach would provide appropriate flexibility to industry and permit writers, even if the specific technology requirements were not identified long in advance. Over time, both facility owners and regulatory agencies are likely to develop more accurate predictions of the types of technologies that would be appropriate at individual facilities.

EPA Response

See response to 316bNFR.068.312 and 068.018 and the preamble to the final rule.

Comment ID 316bNFR.068.314

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

The Site-Specific Approach Can be Modified to Deal with Administrative and Delay Costs

The EPA notes that the site-specific approach may lead to greater costs to both permit applicants and regulatory authorities that implement 316(b) requirements. These costs include the administrative costs of developing information on 316(b) alternatives as well as the delay costs from any additional time required for the site-specific reviews. EPA uses increased administrative and delay costs as a major rationale for rejecting the site-specific approach (although as also noted above, the Agency does not provide any specific information on the nature or size of these costs). The EPA does, however, propose to include site specific factors in regulatory determinations through proposed procedures for setting additional and alternative BTA requirements (65 Federal Register 49091).

As emphasized above, the site-specific approach allows regulatory agencies and owners of facilities to develop information on the costs and benefits (and other impacts) of alternative CWIS technologies. This information is important to determine which of the possible alternative CWIS technologies should be BTA at the particular site. As noted above, EPA's critique of the site-specific approach ignores the importance of this information to increasing the net benefits of BTA determinations. Substantial administrative or delay costs would be warranted in order to avoid costly mistakes in setting BTA requirements. These mistakes could involve requiring expensive CWIS controls where they are not justified—in which case the mistakes would involve excessive resource costs—or foregoing the possibility of environmental gains from more extensive CWIS requirements than would be set through national requirements. These considerations do not mean, however, that no accommodations should be made to deal with administrative and delay costs.

This section suggests means of taking administrative costs into account in the site-specific approach. We also discuss the disadvantages of EPA's proposed additional and alternative requirements.

EPA Response

See response to 316bNFR.068.310, 068.312 and 068.018.

Comment ID 316bNFR.068.315

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Subject Matter Code 10.05

Limitations of Current 316(b) Permitting Approach

Possible Modifications to the Site-Specific Approach

The administrative costs of the site-specific approach may not be justified in all situations. In some cases, the costs of obtaining this information—including the disadvantages of the delays involved in collecting the information and developing regulatory determinations—may be greater than its value in improving the BTA determination. This possibility suggests the usefulness of a categorical approach that could be used as an alternative to the site-specific approach.

One possibility is for the 316(b) regulations to include an option in which a prospective facility could choose to install pre-approved, highly protective technology in exchange for obtaining a speedy approval of its 316(b) application. This alternative would provide the flexibility to avoid situations where the administrative and delay costs were large relative to the potential gains from a more accurate assessment. The company would voluntarily incur the higher costs of the pre-approved technology in order to reduce administrative costs and to obtain the gains from getting its project approved more quickly. These latter gains would include the gains from getting its facility in operation earlier, and thus getting its products to the market more quickly. A power producer, for example, could choose to install the pre-approved technology—and thereby reduce the administrative costs of information collection and regulatory review—in order to enter the market more quickly.

This option would not detract from the economic advantages of the site-specific regulatory approach. The facility would always be free to choose the site-specific approach and thus incur the added administrative and delay costs if the gains from the additional information were considered to be sufficiently large. It seems appropriate to give the option to the facility owner—rather than to the regulatory agency—because the facility owner is likely to be in a good position to provide a preliminary assessment of the likely costs and potential gains of developing a detailed site-specific evaluation of BTA alternatives.

EPA Response

EPA has adopted a similar two-track approach in the final rule. See response to 316bNFR.068.310. See preamble to the final rule for an explanation of why EPA has not adopted the industry's two-track approach in full.

Comment ID 316bNFR.068.316

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Subject Matter Code 16.2

Request for Comment: Establishing Alternative Requirements

Disadvantages of EPA's Proposed Additional and Alternative Requirements

The EPA proposes that permit writers would require additional (i.e., more stringent) requirements where necessary to ensure attainment of water quality standards (65 Federal Register 49091). The proposed regulations would also allow the EPA to set alternative (i.e., less stringent) requirements under certain circumstances.

These EPA proposals implicitly acknowledge the significance of site-specific factors. These specific accommodations, however, are not a plausible alternative to retaining the site-specific approach, including the modifications noted above. The requirements for determining additional alternatives are excessively vague. The specific requirements for approving alternative standards would not yield the gains from an appropriate site-specific approach.

The proposed 316(b) regulations would require that more stringent ("additional") requirements be included when they are "necessary to ensure attainment of water quality standards, including designated uses, criteria, and anti-degradation requirements." (65 Federal Register 49091). This site-specific requirement is extremely vague and does not provide an indication of the circumstances under which particular 316(b) requirements would be made more stringent. Whether water quality standards are met in a particular water body will depend upon many factors unrelated to 316(b) determinations at a single facility. The proposed regulations provide no indication of how such a general mandate would be interpreted and what its likely effects would be.

In contrast, EPA is very explicit about the criterion that would be used to determine whether less stringent requirements would be allowed. The EPA proposes that

"alternative requirements that are less stringent than the requirements of Section 125.84 [the national requirements] would be approved only if compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during development of the requirement at issue ....(65Federal Register49091)

This criterion would not result in decisions that obtain the economic advantages of the site-specific approach. This criterion does not allow EPA to consider the costs and benefits of alternative BTA technologies in the particular site. Instead, EPA would only consider whether the costs at the particular site were "wholly out of proportion" to the costs assumed by EPA when it set the national technology requirements. Put another way, if EPA set its national BTA requirements on the basis of costs and benefits, this criterion would address only one of the two elements—the costs and not the benefits.

EPA's proposed approach for setting alternative BTA requirements raises the general problems with EPA's approach to setting BTA requirements—BTA is based upon a determination of whether costs

are “affordable” rather than whether costs are appropriate in light of the benefits to be obtained. The following chapter discusses the disadvantages of basing BTA requirements on “affordability” and the advantages of using a cost-benefit framework.

EPA Response

EPA’s approach in the final rule to allowing the permit authority to implement any additional requirement of state law is a simple recognition of section 510 of the CWA. Further, under the CWA in the discharge context, if technology-based requirements, such as those established in this rule are insufficient to meet water quality standards, the CWA requires additional effluent limitations as necessary to meet those water quality standards. Thus, this regulation is consistent with the overall framework of the CWA, recognizing the primary role of the states in implementing the CWA. See response to comment 316bNFR.027.020 for an explanation of the approach EPA adopted with respect to variances for new facility CWISs. See the preamble to the final rule for a discussion of Track 2, which does to some extent take into account site specific factors for reducing impingement mortality and entrainment. See sections V and VIII of the preamble.

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Subject Matter Code 18.2

Compliance Cost/Revenue Test

Economic Disadvantages of EPA's Proposed Affordability Approach

Although "affordability" is a useful concept, it is not desirable from an economic perspective as the sole criterion for selecting BTA technology. The "affordability" test proposed by EPA for BTA determination provides only a partial assessment of the economic factors and issues relevant to the determination of BTA. The EPA's approach has several disadvantages compared to a true benefit-cost test:

* Affordability ignores consideration of costs and benefits of BTA alternatives.
* Affordability ignores consideration of the incremental effects of increasingly stringent (and expensive) alternatives.
* Affordability ignores the indirect effects of the BTA requirements.

EPA Response

EPA disagrees with the comment that the affordability test for BTA determination is inappropriate and provides only a partial assessment of the economic factors and issues relevant to the determination of BTA. This comment reiterates points made in a previous comment. Please see the response to comment number 316b.NFR.068.140.

Comment ID 316bNFR.068.318

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Subject Matter Code 18.2

Compliance Cost/Revenue Test

EPA's Proposed BTA Test Ignores Consideration of Costs and Benefits

EPA's "affordability" test does not compare the costs and benefits of alternative BTA requirements. This inadequacy is contrary to well-established economic principles as well as EPA/OMB Guidelines and, indeed, the principles outlined in the EEA for this regulation.

--Economic Principles Behind Environmental Regulation

As EPA notes in the EEA, environmental regulations are developed to correct market imperfections resulting from externalities (e.g., pollution) associated with the production or consumption of services and goods. Although externalities impose costs on individuals, these costs are not reflected in the prices of goods and services. As a result, the level of these externalities is "too high" relative to the situation in which prices reflect these costs. When prices reflect external costs, the external effects are said to be "internalized" into individual's decisions, thus leading to individual decisions that properly reflect the social costs.

Viewed from this perspective, the development of environmental regulations is an effort to ensure that the production and consumption of goods and services reflect the unpriced costs of these decisions on the environment. This perspective is consistent with the view taken by EPA in the EEA:

The goals of environmental legislation and subsequent implementing actions, such as the 316(b) regulation that is subject to this analysis, is to correct environmental externalities by requiring the responsible parties to reduce their actions causing environmental damage… These actions result in a supply of goods and services that more nearly approximates the mix and level of goods and services that would occur if the industries impinging and entraining organisms fully accounted for the costs of their AEI-generating activities. (EPA 2000, p. 2-6)

Regulations provide a means of internalizing the cost of externalities in the production and consumption decisions of individual producers and consumers.

--EPA and OMB Guidelines

The importance of cost-benefit analysis as a tool to developing appropriate regulatory requirements is indicated in both EPA and OMB guidelines. The EPA, for example, provides the following recommendations for any economic analysis:

For most practical applications, therefore, a complete economic analysis comprises a benefit-cost analysis, an economic impacts analysis, and an equity assessment. (EPA 1999)

Guidelines by OMB are consistent with this perspective, suggesting that an economic analysis should

provide information allowing decision-makers to determine whether,

[t]he potential benefits to society justify the potential costs, recognizing that not all benefits and costs can be described in monetary or even quantitative terms, unless a statute requires another approach. (OMB 1996)

The economic test proposed by EPA fails to compare costs and benefits. Thus, the approach fails to provide any assurance that BTA determinations would result in positive net benefits.

--EPA's Engineering and Economic Analysis

The lack of a cost-benefit test for BTA is particularly surprising given statements by the EPA in the EEA that appear to support the cost-benefit approach. In justifying regulatory interventions in environmental problems, the EEA states that:

This approach to addressing the problem of environmental externalities will generally result in improved economic efficiency and net welfare gains for society if the cost of reducing the activities causing environmental harm is less than the value of benefits to society from the reduced AEI. (EPA 2000)

While EPA appears to recognize the importance of costs and benefits in describing the rationale for regulatory intervention, the Agency does not follow through with the implications of this position in developing the proposed BTA rule.

By failing to consider benefits, EPA's proposed BTA test would not determine whether a given BTA alternative produced net social benefits. Failure to consider benefits in BTA determination represents a significant contradiction with the Agency's position on the proper approach to address externalities.

EPA Response

EPA disagrees with the comment that the affordability test for BTA determination is inadequate and contrary to well-established economic principles as well as EPA/OMB Guidelines because it does not consider costs and benefits. The total annualized cost of the final rule is relatively low, under $50 million per year. EPA has considered costs and benefits in developing the final rule as appropriate and to the extent such analyses are supported by available data. See Sections VI.H and I, VIII and X.A of the preamble to the final rule. Also see responses to 316bNFR.053.023 and 041.010.

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Subject Matter Code 18.2

Compliance Cost/Revenue Test

Failure to Consider Costs and Benefits May Lead to Perverse Policy Outcomes

The three economic "affordability" tests fail to account either for the environmental benefits provided by CWIS investments or any adverse environmental impacts associated with CWIS investments. These tests contain no information about whether or not these compliance costs yield commensurate or even any reductions in net adverse environmental impacts.

Table 7 shows an example of how the proposed EPA test for BTA could lead to an economically-incorrect policy decision. Consider an electricity company with two plants facing an "affordability" test. For this example, assume that compliance costs are the same for both plants. Plant A is a high revenue plant, while Plant B is a lower revenue plant. The characteristics of the natural resources affected by these plants differ dramatically.

Using the economic-affordability test, the proposed BTA would pass the test at Plant A and would fail the test at Plant B. Thus, environmental-protection resources would be expended to protect the lake at Plant A, rather than protecting the lake at Plant B.

A BTA test that compares costs with benefits would reach a different conclusion. For this example, we focus on recreational benefits for the sake of simplicity. Plant A uses water from a lake with relatively little recreational value because of its location, characteristics, and substitutes. In contrast, Plant B uses water from a high-value lake. Using EPA's economic affordability tests, therefore, would expend environmental-protection funds to protect a low-value lake while allowing a high-value lake to go unprotected.

This example uses the compliance cost/revenue test. A similar example could illustrate the problem with the other two affordability tests, based on construction cost and discounted cash flow. If Plant A is a larger plant with higher construction costs or discounted cash flow relative to Plant B, then Plant A would receive the increased environmental protection and Plant B would not. Again, the decision would have nothing to do with the relative value of the environmental resources to be protected.

Table 7. Example of Failure of Economic "Affordability" Tests

	Plant A	Plant B
Compliance Costs	C<sub>0	C<sub>0
Revenue base	Very high revenue	Relatively low revenue
Lake characteristics	Remote, no recreational amenities, very little public	Close to population center; improved with hiking trails,

	access, low aesthetic value, poor baseline aquatic habitat, lack of high-value sport fish,	picnic areas, boat ramp; easy access from major roads; maintained as a park with good high aesthetic value; baseline aquatic habitat supports high-value sport fish and shore birds
Substitute sites available	Several lakes with superior recreational amenities exist closer to the population center	Only water-based recreation site in the area
Pass Economic "Affordability" test?	Yes	No
Pass Benefit/Cost test?	No	Yes

This example illustrates the regulatory mistakes that would arise if decisions are evaluated without careful attention to benefits. Benefits can be difficult to measure and express in dollar terms. It can be difficult to predict the level of actual environmental protection (i.e., reduction in entrained fish) that will be realized. It can also be difficult to determine what resource services are enhanced by the environmental protection and to put a dollar value on those services. Indeed, EPA and OMB both have established methods for evaluating benefits in the face of those difficulties, rather than just ignoring benefits completely. If benefits information is developed for alternatives, decision makers can use the relative levels of benefits to inform the BTA decision. Note that the benefits information would include judgments on the benefits (and costs) that might be omitted in the quantified information. Relying only on the affordability tests, in contrast, means that no information on benefits can inform these determinations.

EPA Response

EPA appreciates the illustration provided by the commenter. However, EPA disagrees that a cost-benefit analysis is required. The total annualized cost of the final rule is relatively low, under $50 million per year. Further, the final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. EPA has considered the potential benefits

associated with the implementation of these technology requirements. These include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures.

The two-track approach developed for the final rule allows new facilities the freedom to determine the most cost-effective approach to achieving compliance. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit applicant to select and implement design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish. Track II allows permit applicants to conduct site-specific studies to demonstrate that alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I.

EPA evaluated the requirements of the final rule by considering the annualized compliance costs of the rule compared to the estimated facility revenues, as well as the initial compliance costs compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA, to which section 316(b) refers, and is consistent with the language and legislative history of section 316(b) of the CWA.

Finally, the commenter is incorrect in stating that Plant B would not receive increased environmental protection. If Plant B is truly in a degraded waterbody, EPA expects that it may be able to meet the requirements of the rule under Track II. In any event, EPA wishes to point out, however, that based on the low economic impacts expected from this regulation, such restrictions are unlikely.

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Subject Matter Code 18.1

Elimination of "Wholly Disproportionate" Cost Test

The "Wholly Disproportionate" Test Improperly Compares Costs and Benefits

The cost-benefit perspective also provides important insights into the proper balancing of costs and benefits for a BTA test. The cost-benefit perspective indicates that incremental benefits and incremental costs should be balanced so that net social welfare is maximized. The "wholly disproportionate test" developed by EPA twenty years ago is not consistent with this perspective. The wholly disproportionate approach appears to be motivated by the unsubstantiated assumption that measured benefits are consistently and significantly understated relative to costs. Both costs and benefits include components that are difficult to measure and thus involve some degree of uncertainty. For example, cooling-tower costs are not limited to construction, operation, and maintenance costs. The reduction in operating efficiency will reduce electric power generation, whose value is highly variable in competitive electric power markets.

A careful benefit-cost analysis of BTA alternatives could evaluate uncertainties in the cost and benefit components. EPA's approach of overcorrecting for perceived relative biases in estimates of costs and benefits is incompatible with the economic guidelines. The economic tools available for understanding and quantifying both benefits and costs have improved substantially over the past twenty years. By promoting an unbalanced comparison of costs and benefits, the "wholly disproportionate" test encourages BTA choices that, by definition, could impose social costs potentially much greater than social benefits.

EPA Response

EPA agrees with the commenter's claim that the "wholly disproportionate" is not appropriate for BTA determination. For further information on EPA's position on use of the "wholly disproportionate" test for BTA determination, see EPA's response to comments 316bNFR.053.002 and 316bNFR.052.009 above.

EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule. Further, EPA is seeking certainty and speed in permitting new facilities and believes that the approach it has taken meets those objectives in a better way than the approach suggested by the commenter.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

EPA's Alternative Ignores Considerations of Incremental Effects

An important element of a complete BTA assessment is the consideration of the costs and benefits of all feasible technologies or operational requirements to achieving 316(b) goals. EPA's recommended BTA test does not appear to incorporate evaluation of multiple BTA alternatives. Failure to examine alternatives seriously limits the usefulness of information derived from the economic analysis by failing to provide any information on the incremental costs and benefits of alternative requirements.

There are a large number of technology and operational requirements that are for BTA candidates. These alternatives include the following:

* Changing/altering intake location;
* Operational requirements (e.g., seasonal flow reductions);
* Technologies to reduce intake velocity (e.g., passive screens); and
* Technologies to reduce impingement and entrainment (e.g., traveling screens, fish baskets, Gunderboom, fish deterrents (strobe lights, air bubble curtains, and sound)).

As noted in Chapter II, the costs and benefits of these alternatives vary significantly depending on a large number of factors, including the following:

* Local aquatic species. The effectiveness of various alternatives at reducing impingement and entrainment varies widely by species.
* Intake design. The feasibility of installing different technologies on existing CWIS varies widely with the type of facility and its intake design.
* Intake location. The impact of a BTA alternative on aquatic species depends greatly on the intake location and the species in the vicinity.
* Seasonal Conditions. Seasonal weather, turbidity and debris affect both the costs of alternatives and their effectiveness.
* River Conditions. River flow and geography affect the ability to site various technologies, their cost to develop and their effectiveness in reducing impingement and entrainment.

Because of the many factors affecting the costs and benefits of BTA alternatives at different locations, the cost-benefit analysis should include all alternatives that are feasible and likely to be effective at the site. Variations in costs and benefits due to these factors will lead to different cost-benefit ordering of BTA alternatives for different facilities. A cost-benefit analysis of alternatives therefore will be the most effective approach for identifying technologies that are most advantageous in terms of the benefits produced and the costs incurred.

Evaluation of the costs and benefits of feasible alternatives provides the information that is necessary to identify the most appropriate technologies at a particular location. This evaluation can provide two

types of information on feasible alternatives:

1. Dominated Alternatives. An evaluation of alternatives can identify which alternatives are “dominated” by others. One alternative dominates another if it provides greater benefits at a lower cost.

2. Incremental Costs and Benefits. The incremental costs and benefits of an alternative are the costs and benefits of the alternative relative to the next less stringent alternative.

Chapter II provided an example of the use of incremental analysis. Evaluation of the incremental costs and benefits of alternatives allows permit writers to assess whether the benefits gained by requiring a more costly technology justify the additional costs.

The importance of evaluating alternatives is recognized in EPA’s Guidelines for Preparing Economic Analyses, which states that:

In addition to considering a wide variety of possible approaches for environmental protection, analysts and policy makers should also examine other characteristics of regulatory and non-regulatory policies that affect their costs and effectiveness. For example, evaluating the benefits, costs and other effects at different levels of stringency for a given policy can help to determine setting that provide the greatest net benefits to society (EPA 1999).

Thus, EPA’s own guidance recognizes the importance of evaluating alternatives to identify appropriate requirements.

EPA Response

EPA disagrees with the commenter's claim that EPA's recommended BTA test does not appear to incorporate evaluation of multiple BTA alternatives. EPA considered a wide range of technologies in establishing BTA for minimizing adverse environmental impact of a cooling water intake structure (see the Technical Development Document). The two-track rule establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies referred to as "proportional-flow requirements" (Track I). Track II allows permit applicants to conduct site-specific studies to demonstrate that lower cost alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I, thus providing for flexibility for compliance with the rule.

In addition, EPA has considered several regulatory alternatives for establishing BTA. See response to comment 316bNFR.068.337 in comment category 24.4.

Finally, EPA disagrees with the commenter's suggestion that economic cost-benefit analyses be utilized in the evaluation of best technology available. EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and

316bNFR.0068.008 and the preamble to the final rule.

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Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

EPA's Alternative Ignores Important Electric Power Costs

EPA's approach to BTA appears to involve assessing only the construction and operating costs of the proposed requirements. For many facilities, these costs will account for the bulk of the relevant costs. In the case of electric power facilities, however, this approach is seriously incomplete.

Some CWIS alternatives reduce the performance of electric power generation facilities, thus reducing the quantity of power that can be generated. Reasons for these various performance penalties include the following:

- Reductions in flow or velocity. Reductions in flow or velocity reduce the effectiveness of the cooling system. As a result, the quantity of power that can be generated by the electric generation facility declines.

- Reductions in cooling efficiency. Some technologies reduce the efficiency of the cooling water system to condense the steam turbines. Close-cycle cooling systems, for example, generate turbine backpressure due to the reduced efficiency of the cooling system, which reduce power generation performance.

- Auxiliary power requirements. Many CWIS technologies require electricity. These auxiliary power requirements reduce the net electricity generation produced by the facility.

These power costs should be included in an assessment of the costs of CWIS alternatives.

Reductions in power plant performance can also adversely impact the reliability of the electric power system, potentially increasing the risk of brownout, blackouts, or curtailments in load provided to particular users. These reliability impacts should be considered in a full assessment of the impacts of alternative BTA requirements. BTA alternatives that require reduced water flows during active biological periods may particularly exacerbate reliability problems, since these important biological periods often coincide with periods when electric power is in greatest demand.

EPA Response

See response to comment #316bNFR.068.332 and Chapter 3 of the Technical Development Document.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Economic Advantages of the Appropriate Cost-Benefit Test for BTA

The methodology for determining BTA should rely on a procedure that considers alternative feasible technologies and operational requirements for reducing impingement and entrainment. The costs and benefits of alternatives should be estimated to identify the "best" alternative available to achieve 316(b) goals. The "best" alternative is the one that maximizes the net benefits (i.e. benefits minus costs).

EPA Response

EPA disagrees with the comment that a cost-benefit analysis is required for the determination of BTA. First, the total annualized cost of the final rule is relatively low, under $50 million per year, and thus EPA is not required to complete a formal benefits analysis under Executive Order 12886. In addition, for the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. EPA determined economic practicability by using the most current data available in considering the cost of compliance as compared with the revenue of a facility, as well as the cost compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA, to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA.

EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule. See also response to comment 316bNFR.068.321 above.

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Best Technology Available-Cost Considerations

A Cost-Benefit Procedure for BTA Determination

Determination of BTA for CWIS at new facilities requires a reliable and effective approach considers the costs and benefits of alternative technologies and operational requirements for reducing AEI. Economists and other analysts have developed well established procedures to evaluate the benefits and costs of alternatives. The net benefits are maximized by adopting increasingly expensive alternatives only if the incremental benefits exceed (or equal) the incremental costs.

The proper cost-benefit procedure can be summarized in the following process.

1. Identification of alternatives. Identify alternatives for the specific site, including technology combinations.

2. Cost and benefit valuation. Develop information on the expected costs and expected benefits of each alternative, putting the elements into dollar values to the extent feasible.

3. Organization of alternatives. Array the alternatives in terms of increasing expected costs.

4. Incremental analyses. Calculate the incremental costs and incremental benefits of each alternative.

5. Identification of most efficient alternative. Identify the alternative – which could include a combination of technologies – that has the greatest net benefits (i.e., benefits minus expected costs).

6. Uncertainty analyses. Identify uncertainties and elements that cannot be put in dollar terms and the range of uncertainty in the estimates. Determine the affects of these uncertainties on BTA choice.

This cost-benefit analysis can be supplemented by other assessments as part of a full analysis of BTA alternatives. Two factors may be particularly relevant:

- Affordability constraints. The alternative that maximizes net social benefits may not be financially feasible for the affected plant. This consideration is particularly relevant now as the electric generation sector becomes subject to increasing competitive pressures.

- Distributional equity considerations. The geographic or socioeconomic distribution of benefits and costs for the alternative that maximizes net benefits may be socially unacceptable. For example, the choice of an expensive technology could impose unacceptable job losses in a region of already high unemployment.

EPA Response

EPA appreciates the illustration of a proper cost-benefit procedure. However, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule. Also see response to comment 316bNFR.068.321 above.

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Subject Matter Code 21.0

Cost/Benefit Analysis

Specific Issues in Cost and Benefit Estimation

Cost-benefit analyses require the careful enumeration of the monetary value of different impacts resulting from BTA alternatives. These impacts are typically separated into costs (negative impacts) and benefits (positive effects), although the two categories are closely related. Methodologies have been developed to value different impacts using well-established procedures, including the use of procedures to deal with limitations on the availability of site-specific information. The following sections provide brief discussions of the procedures to evaluate costs and benefits.

a. Evaluation of Social Costs

The costs included in cost-benefit assessments should reflect costs to society as a whole. The cost values should not include effects that represent transfers from one group to another. The current EPA Cost-Benefit Guidelines define social cost as follows:

The total social cost of pollution control are the opportunity costs incurred by society because of regulation. They are the value of goods and services lost by society resulting from the use of resources to comply with and implement a
regulation, and from reductions in output. (U.S. Environmental Protection 1983, Appendix B, p. 3).

The most significant component of the total costs for regulatory requirements typically is the value of the private resources required by the regulation. The EPA Cost-Benefit Guidelines, for example, state: “The principal component of total social costs is private real-resource costs. These are pretax compliance costs net of any transfers, such as emissions fees, licensing fees, or subsidies.”(U.S. Environmental Protection Agency 1983, Appendix B, p.3). Other components of social costs noted in the EPA Cost-Benefit Guidelines include unpriced resources as well as governmental regulatory costs, deadweight welfare losses, and adjustment costs (U.S. Environmental Protection Agency 1983, Appendix B, p. 4).

The most important social costs of BTA alternatives for electric power facility can generally be organized into the following four categories:

1. Capital costs. Capital costs are the one-time costs of constructing and installing the CWIS technology.

2. Operating and maintenance cost. Operating and maintenance costs are the annual costs to operate and maintain the CWIS technology.

3. Power costs. Implementation of BTA alternatives may lead to power losses due to plant shut-down during construction or impacts of BTA alternatives on plant performance. These power losses lead to

social costs.

4. Other Environmental costs. These include the environmental costs that result from the installation of the CWIS technology. They include, for example, potential air pollution increases.

The first two cost categories capital costs and operations and maintenance costs are conceptually simple and will not be discussed further.

Power costs may occur during the following two periods of plant operations:

- Power Costs during Construction Delay. If the alternative would delay the opening of the plant, then the power output (generation and capacity) would be lost during that period. The costs of replacing the lost power represent real costs.

- Power Costs during Continuing Operations. BTA alternatives may lead to reductions in plant performance due to auxiliary power requirements, turbine inefficiencies (heat or performance penalties), and reductions in maximum generation capacity. Each of these impacts results in power costs.

Note that power losses include both the loss in available capacity as well as the loss in expected energy output. The traditional way of calculating these costs is to determine what additional costs would be incurred in the utility's system to make up the loss internally. With increasing competition in wholesale electric power markets, these costs can be increasingly determined from market prices, both for capacity and energy output.

Environmental costs reflect the cost of environmental externalities that can result from implementation of BTA alternatives. These costs can sometimes be difficult to if they are not priced through market exchanges. In a growing number of situations, however, markets for environmental externalities can provide information on the cost of these externalities. The following are examples of potential environmental costs:

- Water contamination. A potential BTA technology might require that a water body be dredged, requiring disposal of potentially hazardous material and possibly releasing that hazardous material into the environment.

- Air emissions. The auxiliary power requirements and performance penalties resulting from cooling towers typically result in power costs. Increased generation from other power sources is necessary to offset the power losses. Replacement power may increase overall electricity air emissions or increase the cost of achieving emissions targets.

- Visibility and wildlife impacts. Implementation of cooling towers, for example, may result in visibility impacts due to the siting of large cooling towers, and wildlife impacts, (e.g. birds that collide with cooling towers).

Markets are sometimes available to price these environmental costs. The prices of emissions permits in cap-and-trade programs for NOx and SO2, for example, provide reliable sources of information on

the costs of changes in air emissions.<FN 1> When markets are not available for these costs, they should not, however, be ignored. These costs should be included in a quantitative or qualitative fashion as part of the overall cost of CWIS technology alternatives.

b. Evaluation of Benefits

The benefits included in the cost-benefit assessments should reflect benefits to society. Estimates of environmental benefits reflect social benefits when they are based on the willingness to pay (WTP) of individuals who receive the increased environmental services (e.g. recreational fishing services). WTP represents the value of a good or service in monetary terms (i.e., the amount the individual is "willing-to-pay" in dollar terms). The current EPA Cost-Benefit Guidelines for benefits assessment summarize this approach as follows:

The satisfaction that individuals experience because of the environmental improvement is a measure of the benefits of the regulation. Assuming that people are aware of the effects of pollution, these benefits can be expressed in monetary terms by identifying individuals' willingness to pay for an environmental improvement. (U.S. Environmental Protection Agency 1983,
Appendix A, p. 2, emphasis in original)

This approach to measuring benefits is consistent with Office of Management and Budget Guidelines (1996) and standard economic texts (e.g., Stokey and Zeckhauser 1978, Tietenberg 1996 and Nau 1997).

The EPA cost-benefit guidelines provide indications of the types of analyses involved in determining benefits from alternative CWIS alternatives. The EPA cost-benefit guidelines identify two components of ecosystem benefits (U.S. Environmental Protection Agency 1983, Appendix A, p. 30):<FN 2>

1. Benefits from Changes in Commercial Species. Regulatory requirements leading to changes in the stock of species used commercially (e.g. commercial fishery stocks) can lead to changes in yields or total production. Under these circumstances, the guidelines state that "[In] the special case of output changes that do not affect market prices, the appropriate measure of producer's surplus is simply the expected change in output multiplied by market price per unit."

2. Benefits from Changes in Recreational Species. Regulatory requirements leading to changes in the stock of species used recreationally (e.g., recreational fishery stocks) can lead to changes in recreational benefits. Under these circumstances, the guidelines suggest using methods that capture individuals' willingness-to-pay for recreational services.

Both commercial and recreational fishing benefits can be estimated using methodologies and specific empirical studies in the economic literature. This information can be used to develop reliable estimates of the benefits to society from CWIS changes.

Footnotes

1 Under the Title IV SO2 trading program and NOX SIP Call, the overall quantity of emissions does not change if emissions go up in some facilities, but the distribution of emissions across facilities may change. As a result, changes in air emissions due to SWIS technologies would lead to changes in the cost of achieving emissions caps.

2 These guidelines apply in cases in which the ecosystem is not in jeopardy.

EPA Response

a. Evaluation of Social Costs

EPA agrees with the commenter that cost-benefit analyses require the careful enumeration of the monetary value of different impacts from BTA alternatives. Further, EPA agrees that the most important costs of BTA alternatives for electric generators include the capital costs of compliance, operating and maintenance costs of BTA technologies, power costs and environmental costs. EPA has fully considered each of these costs in the analysis of the final rule and has determined each to be acceptable.

The commenter further elaborates on the various components of the power costs and environmental costs of BTA requirements. The comment suggests that power costs must consider the cost of lost power production due to delays in opening facilities as well as the power cost associated with auxiliary power requirements and reduced generating capacity. The comment also states that the enumeration of environmental costs should consider the costs of potential water contamination, air emissions, and visibility and wildlife impacts.

In response to concerns about delays associated with pre-operational construction of BTA technologies, EPA has designed the final section 316(b) New Facility Rule to minimize such delays. The two track approach allows facilities to avoid these delays by complying with the requirements of Track I. EPA's analysis shows that 93 percent of in-scope combined-cycle facilities and 71 percent of in-scope coal facilities already comply with the requirements of Track I in the baseline and therefore would not experience any operational delays. EPA therefore believes that the final section 316(b) New Facility Rule will not result in significant costs associated with delays in new facility operation.

With regard to the inclusion of power costs associated with auxiliary power requirements and reduced generating capacity resulting from BTA technologies, EPA has included the energy penalty of operating pumps, fans, and other equipment associated with BTA technologies in the final analysis. For a more complete discussion of costs associated with the final rule please see Chapter 6 of the Economic Analysis.

In response to the comment that environmental costs should include the costs of potential water contamination, air emissions, and visibility and wildlife impacts, the final analysis does consider these costs. For the final rule, none of the BTA technologies require dredging beyond what is necessary for the baseline equipment. As such these costs were determined not to be relevant to the final analysis. In terms of costs associated with air emissions, EPA has considered these costs and believes that the impacts associated with increased air emissions (SO2, NOX, CO2, and Hg) resulting from cases where facilities with once through cooling systems are required to install recirculating systems with cooling towers are acceptable. The increased SO2, NOX, CO2, and Hg attributed to facilities that would be required to install wet cooling towers in lieu of once-through cooling systems is negligible in comparison to the total annual air emissions from new power plants. Finally, with regard to environmental costs associated with visibility and wildlife impacts, EPA has qualitatively assessed these impacts and determined that they are minimal. EPA's analysis shows that 93 percent of in-scope

combined-cycle facilities and 71 percent of in-scope coal facilities already have cooling towers and thus the visibility and wildlife impacts of siting new cooling towers as a result of the final rule are insignificant.

b. Evaluation of Benefits

The Agency agrees with the commenter that:
(1) the benefits included in the cost-benefit assessments should reflect benefits to society whenever possible;
(2) estimates of environmental benefits reflect social benefits when they are based on the willingness to pay (WTP) of individuals who receive the increased environmental services (e.g. recreational fishing services);
(3) WTP represents the value of a good or service in monetary terms (i.e., the amount the individual is "willing-to-pay" in dollar terms;
(4) both commercial and recreational fishing benefits can be estimated using methodologies and specific empirical studies in the economic literature; and
(5) this information can be used to develop reliable estimates of the benefits to society from CWIS changes.

EPA would like to point out, however, that the use of willingness to pay measures, as with all other benefit transfer measures, requires a detailed quantitative benefit analysis of the proposed new facilities rule, which the Agency was not able to provide because much of the necessary information was unavailable.

See Responses to comments 316bNFR.068.142, 316bNFR.068.333, 316bNFR.068.334, and 316bNFR.069.014.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Advantages of the Cost-Benefit Approach

The cost-benefit approach to BTA determination has several important strengths:

* Appropriate BTA standards for individual units. Consideration of the incremental costs and benefits of alternative CWIS technologies allows BTA decisions to properly reflect the trade-off between the costs of BTA requirements and the benefits that would be achieved by those requirements.

* Organizes information. It organizes important information about the large number of potential BTA choices in a logical manner.

* Accounting for uncertainty. The cost-benefit framework provides an explicit approach to accounting for uncertainty about both costs and benefits. In particular, the cost-benefit approach provides a more reliable approach than the “wholly disproportionate” tests discussed by EPA.

a. Appropriate BTA Requirements for Individual Facilities

Comparison of the costs and benefits of alternative CWIS requirements allows the “best” technology to be selected in individual cases. Failure to consider the benefits at individual facilities may result in the choice of a CWIS alternative that involves costs not warranted by the resulting benefits (i.e., incremental costs greater than incremental benefits) or that is dominated by another CWIS alternative (i.e., generates fewer benefits at greater costs).

b. Organizes Information

The cost benefit approach provides a clear framework for organizing the many costs, benefits, and other impacts of CWIS alternatives. The approach allows for effects to be assessed through both qualitative and quantitative analysis. The cost-benefit approach provides a framework for organizing information on all of the positive and negative effects of various BTA alternatives.

c. Proper Accounting for Uncertainty

This framework provides a better means of dealing with uncertainty than a “wholly disproportionate” test. A “wholly disproportionate” test would mandate CWIS investments whose measured costs exceed measured benefits by some substantial margin. Such a test is arbitrary and tends to obscure rather than clarify policy choices. The net effect of the “wholly disproportionate” test would be to waste scarce public and private resources.

EPA Response

EPA appreciates the illustration of a proper cost-benefit procedure. However, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule. Also see response to comment 316bNFR.068.321 above.

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Subject Matter Code 8.1

Identification of New Steam Electric Facilities

Limitations of EPA's Projections of New Facilities

The EEA develops estimates of the number and type of facilities to be affected by the proposed 316(b) New Facility Rule. This section summarizes the methodology used to develop these estimates and lists concerns with the accuracy of these estimates.

Overview of EPA Methodology

EPA estimates the number of electric generation facilities affected by the 316(b) New Facility Rule over the period 2001 to 2020. These estimates rely on data from the NEWGen Database of planned electric facilities developed by Resource Data International, Inc. and the Annual Energy Outlook 2000 (AEO2000) published by the Energy Information Administration. EPA's methodology follows the following four steps:

1. Identify facilities in the NEWGen database relevant to 316(b) rule. The NEWGen database provides information on new electric generation facilities under development. EPA excluded facilities that were: (1) not in the U.S.; (2) had been "cancelled" or "tabled"; (3) are to be complete after August 13, 2001 (the assumed promulgation date); (4) use steam as a prime mover; and (5) provide insufficient information on the facility's source of cooling water. These criteria eliminated 410 of the 466 facilities in the NEWGen database.

2. Identify "in-scope" facilities within the NEWGen database. Facilities that fall within the scope of the proposed 316(b) New Facility Rule are identified. EPA uses the following criteria to identify "in-scope" facilities: (1) withdraws from U.S. waters (i.e, not municipal water or "gray water"); (2) does not have an existing CWIS; (3) must require or possess an NPDES permit; (4) has an intake flow greater than 2 million gallons per day; (5) more than 25 percent of the water used is for cooling purposes. Of the 56 new facilities identified by EPA as relevant to the proposed rule, 7 were in-scope and 49 were out-of-scope.

3. Estimate the number of in-scope facilities over the period 2001 and 2020. EPA estimates the total number of facilities affected by the proposed 316(b) rule based on projections of total capacity additions from one most recent.

- Projected Number of Facilities from 2001 to 2010. EPA estimates the number of new generation facilities over the period 2001 to 2010 by dividing total capacity additions over this period from the AEO2000 by an estimate of average plant size. The ratio of in-scope facilities to total new facilities from the NEWGen data is used to scale up the total number of in-scope plants. The resulting estimate is that there would be 13 in-scope plants over the period 2001 to 2010, with 7 identified in the NEWGen database.

- Projected Number of Facilities from 2011 to 2020. A similar methodology is used to estimate the number of in-scope facilities over the period 2011 to 2020, resulting in an estimate of 27 in-scope facilities over the period 2010 to 2020. Of these 27 in-scope facilities, 16 are anticipated to be coal-fired and 11 are anticipated to be natural gas combined cycle units.

EPA May Understate the Electric Generation Facilities Subject to this Proposed Rule

EPA's analysis of the number of facilities affected by proposed 316(b) regulations relies on the accuracy of the NewGen database, many assumptions regarding future conditions in the electricity sector, and the reasonableness of extrapolation procedures. A recent study by OnLocation and the EOP Group (OnLocation/EOP Group 2000) assesses the various elements of the EPA projections of the number of new facilities subject to the proposed regulations. That study raises concerns with the following elements of EPA's analysis.

- EPA's Sampling Procedure. EPA should undertake additional measures to ensure that data from the NEWGen database provides an unbiased sample of future capacity additions, and that EPA's use of the NEWGen data does not introduce biases. An evaluation of the NEWGen data by OnLocation/EOP suggests that such biases may exist. For example, EPA excludes information on the 38 facilities that provided inadequate or incomplete information on CWIS. Simply excluding these facilities may, however, bias the results. A subsequent, independent sampling of these facilities suggests, in fact, that a large percentage of these facilities would be affected by the rule. The OnLocation/EOP analysis finds that 50 percent of the facilities in this group of excluded facilities would need to comply with the proposed rules. In comparison, EPA finds that only 12.5 percent of facilities providing information would be affected. More accurate estimates could be developed by the EPA by surveying facilities with incomplete information, rather than simply excluding them.

- Energy Sector Projections. The EPA's methodology is based on projections for generating capacity additions developed by the EIA. The projections, however, are based on fairly conservative assumptions regarding anticipated growth in demand for electricity. While demand for electricity has grown by 2.4 percent annually over the period 1994 to 1999, the EIA projections assume only 1.4 percent growth in electricity demand through 2020. Even EIA's high economic growth scenario, which assumes 1.7 percent growth in demand, is less than recent growth trends. The EPA's appear to potentially understate actual growth over the next two decades, thus understating the number of facilities that would be affected. The uncertainty in future conditions and alternative assumptions about future growth in demand should be more fully examined in EPA's analysis.

- Geographic Sample. Geographic biases may be present in the NewGen since reporting requirements for facilities under development differ substantially across states. Facilities in states with more stringent reporting requirements may be more likely to be included in the NewGen data base (OnLocation/EOP 2000). EPA should take steps to ensure that its analysis accurately reflects national conditions, rather than those of particular regions.

- Facility Size. EPA assessment of the average size of future facilities may be overstated. Overstating facility size would lead to an understatement of the number of facilities affected. Data from the NEWGen data base and other sources suggests that the size of combined-cycle gas generation and coal generation units may be smaller than assumed by EPA (OnLocation/EOP 2000).

These issues could have a substantial effect on the number of facilities subject to the proposed regulations. OnLocation/EOP (2000) finds that 209 facilities would be affected by the proposed rules, in contrast to EPA's estimate of 40 facilities. The five-fold difference in results between two estimates suggests the importance of an expanded assessment of the number of facilities likely to be affected by 316(b) rules that takes into account the concerns raised in OnLocation/EOP report (2000).

EPA Response

The commenter's summary of the analytic methodology used for proposal is accurate. Since the proposal analysis, EPA has updated and expanded its research in order to reflect the most recent data available. EPA has also altered the approach for estimating the number of new in-scope coal facilities to incorporate new data sources. For information on EPA's projection of the number and cooling water characteristics of new in-scope electric generators, see response to comment 316bNFR.042.003 and Chapter 5: Baseline Projections of New Facilities in the Economic Analysis document.

EPA has considered each of the analytic issues raised by the OnLocation and EOP Group analysis submitted by the commenter. EEPA disagrees with the commenter's claims. For an in-depth discussion of these issues please see EPA's response to Appendix A of EEI's NODA comments at 316bNFR525.101 of this response to comment document.

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Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

EPA Understates the Cost of Closed-Cycle Cooling Systems

The EEA's assessment of the cost of closed-cycle cooling systems appears to reflect a failure to consider fully the technical complexity and details of the design of these facilities. As a result, the EEA makes several inaccurate or incompletely documented assumptions, leading to cost estimates that significantly understate the likely costs of these systems. The following are among the flaws in the EEA cost estimates:

1. Capital Costs. EPA understates equipment and capital costs of cooling system construction due to both flawed assumptions and methods. These include the following:
- EPA fails to account for many capital cost components; and
- EPA's assumes design criteria that understate costs.

2. Operations and Maintenance Costs. EPA underestimates operating and maintenance costs of cooling systems:
- EPA assumes inaccurate cost components for operating and maintenance.
- EPA's assumptions understate makeup water costs.

3. Dry Cooling Costs. EPA does not document the capital and operating costs of dry cooling systems.

EPA Response

Regarding the basis for the costs of cooling tower systems in EPA's NODA (66 FR 28853), EPA provided documentation to demonstrate that capital cost components of cooling towers were in fact accurately included in its cost estimates. Additionally, EPA provided significant data to support its estimates of critical design criteria, such as the design temperature approach. The commenter did not provide any information to counter EPA's design criteria, nor did they provide information to demonstrate what, if any, capital cost components EPA left out of its estimates.

The operation and maintenance costs of cooling towers was also discussed in the NODA. EPA acknowledges that its proposal estimates for economies of scale for operation and maintenance costs of cooling towers was not appropriate for national cost estimates and has since revised its estimates. See response to comment 316bNFR.068.330.

Regarding dry cooling systems, EPA included the appropriate supporting information in the NODA (66 FR 28853) and in the Technical Development Document for the final rule.

EPA views the national and facility level cost estimates of the final rule as reasonable based on the information in the rulemaking record. In fact, independent cost estimates provided by the commenter

as an appendix to these comments show that the commenters own analysis is within a reasonable range of EPA's estimates, notwithstanding design criteria assumptions made in their analysis that overestimate cooling tower size. See response to comment 316bNFR.368.006.

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Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

EPA Understates the Capital Costs of Cooling Towers

(1) EPA Fails to Account for Many Capital Cost Components

EPA's methodology for estimating capital costs is to multiply the cooling system capacity (in gallons per minute, or gpm) by a "rule of thumb" cost factor (in dollars per gpm). Used correctly, these "rule of thumb" cost factors provide a good approximation of the furnished and erected costs of a wet cooling tower. The proper use of such factors has been outlined in many engineering reference books (CEH 1969, Guthrie 1974).

The "rule of thumb" factors used by EPA provide an estimate of the cost of cooling tower. These estimates do not, however, include many essential components of the cooling system, such as wiring, foundations, condenser pumps, noise attenuation treatment, the cost of other equipment, or the cost of construction. These costs of these components and their installation would not be incurred were cooling towers not installed. To account for construction costs, EPA has multiplied the tower equipment costs by a factor of 1.8 (i.e., EPA has marked up the equipment cost by 80 percent) to reflect the costs of erecting cooling towers. However, EPA has not made any additional adjustments to account for the costs of any of the other necessary cooling system equipment noted above. Cost factors that include these costs are typically many times larger than cost factors of the tower alone. For example, in a wet cooling vs. dry cooling comparison study recently completed for UWAG, the capital cost (including construction costs) of a newly built cooling tower for a 250 MW steam turbine-generator in a combined cycle plant was roughly 15 percent of the total capital cost for the entire cooling system (Burns & Micheletti 2000). By estimating only the costs of the cooling tower and ignoring the additional costs associated with the other necessary components of the entire cooling system, EPA significantly understates the costs of these systems.

(2) EPA Assumes Design Criteria that Understate Costs

The cost of a closed-cycle cooling system depends on design criteria for the particular system being considered. Some of the assumptions regarding system design made by EPA when developing its costs estimates lead to an underestimate of the true costs of these systems. One example is EPA's assumptions regarding the "approach" value used in plant cooling systems.<FN 3> As the approach value decreases, the cooling tower size increases, resulting in higher costs. EPA suggests that the approach value should be set between 5-10ºF. EPA's cost factors, however, assume an approach value of 10ºF, resulting in a smaller cooling system. In practice, however, an 8ºF approach value is typically used for cooling towers.<FN 4> Since the system with an 8ºF approach would be larger and therefore more costly, EPA understates the likely costs of closed-cycle cooling system.

Footnotes

3 Approach value is the difference between the lowest water temperature in the cooling towers and the "wet bulb"

temperature, which is a measure of the outside ambient air temperature with a wet rather than dry bulb. (The difference between wet and dry temperatures is a measure of the atmospheric humidity.)

4 One source suggests that the increase in cost for a system with an 8ºF approach relative to a 10ºF approach is at least 15 percent (Cherimisinoff and Cherimisinoff 1981).

EPA Response

The essential costs for the cooling tower system (those attributable to the installation of a cooling tower at a plant that would have otherwise installed a once-through system in absence of this rule) are included in the empirically verified costs of the final rule. Costs for wiring, foundations, noise attenuation equipment, pumps, and the cost of construction, among other items, are included in EPA's estimates of cooling tower costs attributable to this rule. These costs have been included since proposal and EPA clarified this point through the NODA (66 FR 28853). However, EPA notes that noise attenuation is not currently installed at the majority of new facilities, and as such, EPA has not included costs attributable to equipment in its final capital costs estimates. See Chapter 2 of the Technical Development Document for a detailed breakdown of all components and factors included in EPA's cost estimates.

The example presented by the commenter, attempting to demonstrate how EPA has underestimated cost factors of the cooling tower, confuses the costs that are attributable to the rule and misrepresents the very costs presented by the commenter in their own example. First, EPA notes that the commenter refers to the "total capital cost for the entire cooling system" from their referenced example. The "entire cooling system" includes a surface condenser. The surface condenser would be used in both systems and thus is not a cost of this rule. This is an important point, as the capital cost of a surface condenser can approach that of a cooling tower. For example, in the commenter's own examples, the modeled capital costs of once-through systems, composed primarily of a surface condenser, pumps, and an intake structure average $15.6 million for 750-MW combined cycle plants. A primary component of this cost is the surface condenser. Similarly, the recirculating cooling tower systems from commenter's examples have average capital costs of $24.6 million for surface condenser, pumps, intake structure, auxiliary cooling systems, and cooling tower. The commenter is clearly including in this estimate significant capital costs that are not attributable to this rule. Hence, when the commenter asserts that the cooling tower in their examples comprises roughly 15 percent of the "entire cooling system" capital cost, they are decidedly deflating this percentage by including the condenser costs. Fifteen percent of $24.6 million is $3.5 million, which in and of itself is understated for cooling tower capital costs. See Chapter 2 of the Technical Development Document and response to comment 316bNFR.368.012.

The commenter claims that EPA has ignored additional costs associated with the other necessary components of the entire cooling system. As seen in the paragraph above, and in response to comment 316bNFR.368.006, certain components of the cooling system, such as a surface condenser, are not attributable to this final rule. Additionally, the commenter provides no further explanation as to what "additional costs" EPA has ignored, nor specifically, what components they represent. EPA documents the many capital cost components accounted for in its estimates in Chapter 2 of the Technical Development Document. The list of capital cost items accounted for includes the following: recirculating pumps and corresponding piping, make-up water intake structure, intake pumps, intake pump well, intake pump housing, intake piping, splash fill in the tower, service roads, mobilization and

demobilization, process engineering, electrical, site work, controls, contingency, construction, and others.

The design approach of 8 deg F recommended by the commenter is without engineering basis and inconsistent with recent construction projects and trends. The commenter provides no references to support the estimate, only referring to "practice." EPA's design approach of 10 deg F is supported by considerable data. See Chapter 3 of the Technical Development Document.

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Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

EPA Understates Operations and Maintenance Costs for Cooling Towers

(1) EPA's Assumptions for Chemical Treatment and other Cost Components are Inaccurate

The EEA report assumes that the operations and maintenance costs associated with cooling towers decline from 5 percent of capital costs for the smallest towers to 2 percent of capital costs for the largest towers (pages 6-4 and A-20). EPA implies that this is the appropriate way to treat presumed economies of scale associated with cooling tower operations and maintenance costs, but provides little justification for these values. An examination of operations and maintenance costs for existing cooling towers suggests that the EEA assumptions are inaccurate and reflect in inadequate technical assessment of operations and maintenance costs.

The major operations and maintenance costs for cooling systems are: (1) makeup water to replace evaporation and blowdown losses; (2) power for fans and pumps; (3) labor and materials, primarily for maintenance; and (4) cooling water chemical treatment for scale, corrosion, and biofouling control. The cost of makeup water is negligible unless the water must be purchased from a municipality. Assuming that the cost of makeup water is minimal, only the final three costs are significant. Of these three items, EEA only discusses its rationale for "economies of scale" with respect to chemical treatment.

Cooling water chemical treatment costs are extremely site-specific. Variations in the availability and quality of makeup water, construction materials, and cooling system operating practices make it difficult to generalize about cooling water chemical treatment programs and costs. Empirical data from a recent EPRI study suggests that actual operations costs differ significantly from EPA's assumptions (EPRI 1999). Figure 1 presents data on annual chemical treatment costs from almost two dozen power plant recirculated cooling systems (represented by the solid diamonds). This data shows that costs increase with recirculating flow. In contrast, EPA's data (represented by the open circles), suggests that costs decrease as recirculating flow increases. Since EPA fails to provide any background on the source of its data and the
conclusion that total costs decrease with size is somewhat suspect, these assumptions raise concerns about the methodological approaches and empirical values EPA has used to developed its component costs for closed-cycle cooling system operating costs.

Figure 1. Annual Cooling System Chemical Treatment Cost vs. Recirculating Cooling Water Flow
{available as attachment 316bNFR_068_330_Figure}

(2) EPA's Makeup Water Assumptions Understate Costs

Based on EPA's estimates, a closed-cycle cooling system would operate at or below 2 cycles of

concentration. This means that the quantity of makeup water 5 would be twice the blowdown (i.e., the quantity of cooling water periodically discharged into the water body). In practice, however, most power plant cooling systems operate at about 5 cycles of concentration, resulting in significantly less frequent discharge of water into the water body. EPA's assumptions reflects a misunderstanding of the actual design and operation of closed-cycle cooling systems.

The EPA also fails to make facility design consistent with these assumptions. At the lower cycles EPA suggests, more makeup water would be required to operate the plant. Although the costs of additional makeup water itself would be minimal (as noted above), the higher makeup requirements would necessitate larger water pumps as well as higher power use. EPA has failed to account for these cost impacts in its analysis. In addition, the higher makeup water requirements under 2 cycles would increase the cost of CWIS equipment, which must designed and operated to minimize intake water velocity. These cost impacts have not been adequately accounted for either.

EPA Response

(1) Regarding EPA's Proposal Assumptions for Chemical Treatment and other Cost Components

Based on further research and comments received, EPA no longer considers the operations and maintenance (O&M) costs associated with cooling towers to decline from 5 percent of capital costs for the smallest towers to 2 percent of capital costs for the largest towers. EPA concludes that these economies of scale associated with cooling tower O&M costs are not appropriate for all cooling towers.

EPA revisited its O&M cost estimates in the proposal EEA for use in developing a national cost estimate (note that the costs are not intended as a basis for estimating the cost of an individual project). The use of economy of scale in the proposal O&M cost estimates was limited to one small component of the total O&M costs. This component deals with chemical costs and routine preventive maintenance of the cooling tower. Regardless of whether a facility is large or small, it will have to hire labor to do routine preventive maintenance work. EPA estimated that people doing similar work will be paid comparable salaries, and that the salary of a maintenance worker of a 2000 gpm cooling tower will be similar to the salary of a maintenance worker of a 3000 gpm cooling tower, and thus the labor cost per unit flow ($/gpm) will decline as flow increases. Similarly, EPA estimated that a large facility that purchases chemicals in bulk will receive a discount on its purchases greater than the discount for a smaller facility. This "economy of scale" accounted for the gradual decrease in chemical and routine preventive maintenance costs from 5 percent of capital costs for small cooling towers to 2 percent of capital costs for the largest cooling towers.

However, as noted above, chemical/routine preventive maintenance costs are only a small component of total O&M costs. The largest component of total O&M costs is the requirement for major maintenance of the tower that occurs after years of tower service, such as around the 10th year and 20th years of service. These major overhauls include repairs to mechanical equipment and replacement of 100 percent of fill material and eliminators. In reviewing the O&M cost estimates in the proposal EEA, EPA discovered an error in how the costs for major maintenance were calculated. In the proposal EEA, these costs were calculated as annual costs following the years that they were

to occur. However, some of these costs actually represent one-time costs. This calculation error caused the O&M cost estimates in the EEA to be in error on the high side. EPA's total O&M cost estimates in the EEA were (for Douglas Fir cooling towers, for example) about 25-30% of the cooling tower capital cost. The correct value for total O&M costs should be about 50% lower. Hence, that while there may be economies of scale for certain components of O&M costs, there does not appear to be an economy of scale for the total O&M costs.

Based on the commenters' remarks on O&M economy of scale, EPA reviewed CBI material submitted by a power plant for its proposed cooling water system alternatives. The submittal included detailed engineering assessments with capital and O&M costs for various alternative closed-loop mechanical draft cooling tower systems. The estimated O&M costs for the mechanical draft towers included a separate line item for fuel penalties. Two scenarios of cooling water were used in estimating the cooling towers costs, sea water and gray water. The wet cooling tower O&M costs ranged between 4 percent and 5 percent of capital costs, indicating that EPA's original O&M cost estimates are high. In addition, EPA contacted a cooling tower manufacturer and obtained material that showed that EPA's original O&M cost estimates are high.

In summary, the commenter questions EPA's assumption that O&M costs of wet cooling towers reflect an economy of scale with increasing size. In revisiting the issue of O&M costs, EPA also discovered errors in its original calculations used to develop the O&M cost estimates in the proposal EEA. EPA has determined that O&M costs should actually be about 50% lower than those contained in the EEA. These calculations also indicate that, while there may be economies of scale for certain components of O&M, there do not appear to be economies of scale for total O&M costs.

(2) Regarding EPA's Proposal Makeup Water Assumptions

EPA is well aware of the inverse relationship between wet tower concentration factors and corresponding rates of blowdown and make-up water. EPA agrees with the commenter that the make-up water rates used in the impact analysis correspond to concentration factors of less than 2. The make-up water rate used in the proposal and the NODA of 10 percent of the recirculating flow was set at a high value in order to provide very conservative cost estimates (i.e., on the high end of the potential range of intake flow and corresponding intake equipment capital and O&M costs). This was done, in part, to make sure that the intake system compliance costs accounted for the near worst-case situations. One such situation is facilities that use saltwater or brackish water as a make-up water source. Since seawater and brackish water in estuarine cooling water sources have higher dissolved solids (TDS) content than freshwater, the blowdown rate needs be higher to avoid the build-up of high TDS in the recirculating water as the cooling water evaporates in the tower. The commenter's supporting documentation itself has stated that the concentration factor for brackish water should be in the range of 1.5-2.0 (Source: Burns & Micheletti 2000). For the remaining facilities, EPA has estimated that the concentration factors for freshwater systems will range from 2.0 to 10.0 (Kaplan 2000), which is consistent with the commenter's estimate of 5.0. The commenter's statement that EPA did not make the facility design consistent with these assumptions is incorrect. In the economic analysis, EPA used the conservative make-up water factors to estimate the intake volume and sized the corresponding equipment accordingly.

In the final analysis, EPA has refined the estimated make-up water factors such that they are closer

to the values that would correspond to the concentration factors suggested by the commenter. This includes the development of separate make-up water rates for facilities with freshwater sources versus brackish water sources. The new freshwater make-up factor is one half that used in the earlier impact analyses. EPA chose to base these values, in part, on the ranges of concentration factors described above. Again in order to be conservative, EPA chose to use the lowest value of each suggested range as the starting point. In other words, a concentration factor 1.5 was chosen for brackish water sources and a factor of 2.0 was chosen for freshwater.

EPA used the equations presented in the reference Cooling Tower Fundamentals (Hensley 1985) to derive the make-up water rates that correspond to the selected concentration factors of 1.5 and 2.0. Note that the reference provides a set of equations and default values for estimating the rate of evaporation, drift, and blowdown. The make-up volume is the sum of these three components. Input values in this calculation include the concentration factor and the temperature rise. The temperature rise used (20 deg F) is consistent with the design values used throughout the wet tower cost estimation efforts. Since the estimate was for national average values, the default values for estimating evaporation and drift presented in the reference were used. Table 1 provides the output of these calculations for a wet tower with a recirculating rate of 100,000 gpm. Note that the selection of the recirculating flow rate is not important, since the output values are percentages which would be the same regardless of the flow rate chosen.

Table 1 shows the calculated make-up and blowdown rates as a percentage of the recirculating flow for different concentration factors ranging from 1.1 to 10.0. Table 1 shows that at concentration factors of 1.5 and 2.0, the corresponding make-up volumes would be 3.2 percent and 4.8 percent, respectively. Concerned that additional intake water may be needed for other purposes, EPA then increased these factors by an additional 50 percent and rounded up to the next whole number. The resulting make-up factors of 5 percent and 8 percent for freshwater and brackish water systems, respectively, were used in the final analysis.

Table 1. Make-up and Blowdown Volumes for Different Wet Tower Concentration Factors

Concentration Blowdown Factor	Evaporation<a> gpm	Drift<b> gpm	Blowdown gpm	Makeup<c> gpm	Makeup %	%
1.1	1,600	20	15,980	17,600	17.6%	16.0%
1.2	1,600	20	7,980	9,600	9.6%	8.0%
1.25	1,600	20	6,380	8,000	8.0%	6.4%
1.3	1,600	20	5,313	6,933	6.9%	5.3%
1.5	1,600	20	3,180	4,800	4.8%	3.2%
2	1,600	20	1,580	3,200	3.2%	1.6%
3	1,600	20	780	2,400	2.4%	0.8%
5	1,600	20	380	2,000	2.0%	0.4%
10	1,600	20	158	1,778	1.8%	0.2%

<a> Evaporation = 0.0008 * Range (oF) * Recirc Flow (gpm); Source: Hensley 1985
<b> Drift = 0.0002 * Recirc flow (gpm); Source: Hensley 1985
<c> Makeup = Evaporation + Drift + Blowdown; Source: Hensley 1985

Range = 20 Degree F
Recirc Flow = 100,000 gpm

References:

Burns, J.M. Micheletti, W.C. Comparison of Wet and Dry Cooling Systems for Combined Cycle Power Plants. November 4, 2000

Hensley, J.C. Undated. Cooling Tower Fundamentals. 2nd Edition. The Marley Cooling Tower Company (Mission, Kansas) 1985.

Kaplan, Charles. Memo to Martha Segall. April 18, 2000. Subject: Flow Reduction. (Water Docket #1-1073-TC)

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Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

EPA's Cost Estimates for Dry Cooling are Not Well Substantiated

In addition to the above criticisms, which apply to EPA's estimates of the costs of wet cooling systems, there are a number of additional criticisms that apply specifically to EPA's analysis of dry cooling systems. EPA's estimates of the costs of these systems are not well substantiated. Although dry cooling systems would not be required under the proposed 316(b)
rule, they would be required in the "zero flow" regulatory alternatives considered by EPA.

(1) The EEA Does Not Provide a Foundation for Dry Cooling Capital Costs

EPA suggests in the proposed rule that dry cooling is a viable alternative to wet cooling systems (10-2), but does not provide cost equations or curves for dry cooling. The EEA implies that the methodology used to calculate dry cooling costs is based on curves similar to those developed for wet cooling towers. The EEA, however, presents no discussion of the specific calculations or equations used to estimate the costs of dry cooling.

The EEA's methodology suggests that there is a close engineering and cost relationship between wet and dry cooling systems. There are, however, many engineering distinctions that suggest that the methodology used to estimate costs should be very different between wet and dry cooling systems. In particular, it is inappropriate to use a "rule of thumb" (i.e., dollar per gpm) cost factor based on cooling water flow to estimate dry cooling costs, since the most prevalent dry cooling systems (based on a direct, non-contact, air-cooled steam condenser) have no cooling water flow. Consequently, use of a dollar per gpm rule of thumb is completely inappropriate.

EPA has failed to provide a complete and detailed description of its cost methodology for dry cooling capital costs As a result, it is impossible to assess whether its methodology and data appropriately represent the true costs of dry cooling systems. Development of costs estimates for dry cooling systems requires more detailed cost and engineering assessment than is presented by EPA in the EEA.

(2) The EEA Provides No Foundation for Dry Cooling Operating Costs

EPA bases the operations of dry cooling systems on those of wet cooling systems. As with capital costs, the analysis thus assumes an underlying relationship between dry tower Operations and Maintenance costs and wet tower operations and maintenance costs. The operations and maintenance activities required for a dry cooling systems, however, are very different from those required for a wet cooling systems. There is no technical reason to think dry tower operations and maintenance would be related to wet tower operations and maintenance by some common factor, yet EPA has taken that approach.

In fact, there are many significant differences between the operations and maintenance of dry and

wet cooling systems. For example, the operation of a dry cooling systems during the winter is significantly more complicated than the winter operation of a wet cooling tower. As a result, the costs of dry cooling systems are significantly greater. During extremely cold periods, operators of dry cooling towers must run the turbine at a higher backpressure than they would normally to prevent the tubes from freezing. Operating this way leads to inefficient plant use. To avoid such measures, dry towers would require special winterization measures and would probably involve a more complex winter-time operation. In addition, the auxiliary cooling system of a dry cooling tower would also be more prone to winter operational problems. The complications associated with winter operation of dry cooling towers would increase the likelihood of forced outages.

These examples suggest that EPA has failed to provide an adequate technical and cost assessment of dry closed-cycle cooling systems. The EPA should develop a more complete assessment of operations and maintenance costs based on a more detailed engineering assessment.

EPA Response

EPA agrees that the equipment requirements and operation of wet towers and dry towers are significantly different. However, even if wet cooling and dry cooling are different in fundamental ways, the ratio of capital and O&M costs to the size of the system are similar for both wet cooling systems and dry cooling systems. EPA estimated the capital and O&M costs using cost factors for various types of wet towers, as well as for air cooled condensers using the costs of a comparable (in terms of heat removal) wet tower constructed of Douglas Fir as the basis. Table A-4 of Appendix A of the proposal EEA provides the capital and operating cost factors that were used by EPA. These cost factors were developed by industry experts who are in the business of manufacturing, selling and installing cooling towers including air cooled systems for power plants and other applications. For air cooled condensers (constructed of steel) a range of factors is given in Table 4. EPA based both the capital and O&M costs on these factors with some modifications. In applying these factors, EPA chose the highest value within each range as the basis. The factors chosen of 325 percent and 225 percent for capital and O&M cost, respectively, do indeed confirm the commenter's statement that the costs of dry towers are significantly greater than the costs of wet towers.

The commenter has focused on problems experienced by air cooled condensers during "extremely cold periods" and notes that these can be overcome by employment of special winterization measures. EPA further notes that these extreme cold weather problems apply only to plants in the northern regions and only during extreme weather conditions. These problems are operational in nature, and in general, with proper measures taken, plants should not have problems rejecting heat in the winter. At the same time, plants in southern locations will have problems rejecting heat during periods of extreme high temperatures and dust/wind storms, and thus will have additional costs associated with those extremes also. By selecting the higher end of the range of cost factors for air cooled condensers, EPA is confident that the cost estimates are conservative enough to include additional costs for the measures that are necessary to accommodate both extremes, as evident by the verification of the cost model developed by EPA. This verification is documented in the memorandum "Supporting Documentation for Notice of Data Availability (NODA)," dated April 20, 2001. This document includes a graph comparing the dry tower capital cost curve to actual costs.

EPA notes that the costing methodology uses a cooling water flow rate as the independent input variable for costing dry towers. Since the rule focuses primarily on water use, the use of the cooling water flow or the "equivalent" was considered the best way to compare costs. Obviously, as the commenter has noted, dry towers do not use cooling water. However, for every power plant of a given capacity there will, dependent on the selected design parameters, be a corresponding recirculating cooling water flow that would apply if wet cooling towers were installed to condense the same steam load. The equivalent flow rate was determined using the heat rejection rate and cooling system efficiency. Note that the heat rejection rate will be proportional to the plant capacity. Thus, the dry tower costs are developed using equivalent recirculating cooling flow as the input variable; essentially, the costs are derived based on the plant steam load.

For comparative purposes, EPA estimated the flow required for a wet cooling tower that is functionally equivalent to the dry tower by
converting each plant's steam tons/hour into cooling flow in gpm using the following equations as reported in the proposal EEA:

(steam tons/hr) x 2000 (lbs/ton) x 1000 = BTUs/hr (1,000 BTUs/lb steam)
One ton/hr = 12,000 BTU/hr
(BTUs/hr) / 12000 = Tons of ice
(Tons of Ice) x 3 = Flow (gpm) wet systems

Note that for dry towers an additional heat rejection load of 3,000 Btus/hr was added to account for additional heat generated by equipment associated with dry towers (e.g., heat generated by tower fans, chillers, etc.).

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Facility-incurred Costs as a Result of Compliance with Proposed Rule

EPA Fails to Consider All Closed-Cycle Cooling Costs

The EEA's analysis of the cost of closed-cycle cooling systems considers only their capital costs and the annual operations and maintenance costs. The analysis fails, however, to consider other important costs resulting from implementation of cooling towers. In particular, the following costs are not considered by EPA:

1. Power Costs. Closed-cycle cooling towers reduce the performance of generation facilities by increasing auxiliary power loads and reducing the efficiency of the steam turbines through turbine backpressure ("performance penalties"). These impacts results in two sorts of impacts that produce social costs:

- Replacement Power Costs. Both auxiliary power requirements and performance penalties may result in reductions to quantity of energy or capacity provided to end-users. Replacing this power from other higher-cost sources will result in social costs.
- Fuel Costs. As a result of performance penalties which reduce effective heat rates, the quantity of fuel required to generate the same quantity of energy increases.

2. Air and other Environmental Costs. Through performance penalties and auxiliary power requirements, closed cycle cooling towers result in reduced net power generation with no commensurate reduction in fuel use. As a result, air emissions from sources replacing lost power will increase. In addition, cooling towers may result in the following additional environmental impacts:

- visibility impacts from cooling towers;
- local climate change from wet cooling tower plumes;
- wildlife losses (e.g., birds colliding with towers);
- fish losses due to loss of heated aquatic plumes to over-wintering habitats; and
- increased impediments to waterway navigation due to icing in northern regions.

Power costs include both energy and capacity costs. Cooling towers reduce the quantity of energy that can be delivered to end-users and also reduce the quantity of generation capacity available to ensure the reliability of the electric power system. Both of these impacts result in social costs as other resources must be used to replace these lost resources. As noted in Chapter III, these costs can be modeled using data on the market price of energy and capacity from competitive wholesale power markets.

Concern for the power costs and impacts for cooling towers is particularly significant since many of these power impacts are greatest during the summer when demand for energy and capacity is greatest. Performance penalties due to turbine backpressure, for example, will be greatest during periods of high temperatures, also the periods of highest demand. These performance penalties

potentially exacerbate current reliability concerns in many regions.

Although these costs are important components of the cost of cooling towers and have been incorporated into cost-benefit analyses of 316(b) alternatives for existing facilities, EPA fails to consider these costs when evaluating cooling tower costs. The EPA only acknowledgement of the issue is in the last sentence of its chapter on facility compliance costs (EPA 2000, p.6-24):

Finally, estimated costs do not account for reduced energy efficiencies that may result from switching to the use of cooling towers from a once-through cooling system. This energy “penalty” may be considerable and is dependent on specific site characteristics, such as plant type.

While acknowledging that these penalties may be “significant”, the EEA relegates this issue to qualification to its cost assessment, rather than making any attempt to integrate these costs into the analysis.

EPA Response

Through the NODA and in response to comments to the proposal, EPA included significant information and data addressing issues raised in this comment. See 66 FR 28853.

EPA estimates the mean annual energy penalty of a wet cooling tower to be 0.4 percent at a combined-cycle power plant and 1.65 percent for a coal-fired plant. These performance penalties are incorporated into the cost estimates for the facilities expected to upgrade their cooling systems as a result of this rule from once-through to cooling tower systems. Both the replacement power costs and the fuel costs are reflected in EPA's analysis, which accounts for the performance penalty by deducting the appropriate percentage from the facility's revenue. As stated elsewhere in the commenter's NODA comments , not all facilities may be able to supplement their fuel usage to produce the same quantity of energy in absence of the performance penalty. Therefore, EPA concluded that reductions in revenue accurately represent the costs of the energy penalty by reflecting both replacement power costs and fuel costs.

EPA analyzed the increased air emissions that would occur at the nine facilities projected to upgrade their cooling systems from once-through to wet cooling tower systems. EPA estimated the performance penalty for these facilities at 0.4 percent for combined-cycle plants and 1.65 for coal-fired plants. (EPA notes that its analysis of energy penalties distinguishes between power plant types, as recommended by the commenter.) As a result, the nations electricity generation industry is expected to see an increase in air emissions to an equivalent degree to the energy penalty of these nine plants. EPA estimated that the emissions profiles for the increased air emissions would match those of the cross-section of electricity generation across the nation, representing incremental air emissions increases on a national basis. The overall increase in air emissions as a result of the requirements of this rule would correspond to 2560 tons of SO2, 1210 tons of NOx, 485900 tons of CO2, and 16 lbs of Hg. These levels represent a national increase of less than 0.02 percent for each pollutant. These air emissions increases are negligible on both the facility and national basis.

Regarding the quantity of energy that can be delivered to end-users and the quantity of generation

capacity available to ensure the reliability of the electric power system, EPA has analyzed the effects of this rule on both accounts. EPA projects there will be no discernable impact on the reliability of electricity of the electric power system as a result of nine facilities installing cooling towers in lieu of once-through cooling systems. The aggregate capacity reduction at new facilities as a result of this rule is projected to be approximately 100 MW. EPA anticipates that, due to the operation of wet cooling towers, no plant will experience turbine dating impacts due to elevated back-pressure levels. The social costs of this impact are accounted for in EPA's national cost estimates.

With reference to the power costs and impacts for cooling towers during peak temperature periods, EPA has analyzed the impact of this rule for these effects. During short periods with the warmest ambient conditions, EPA estimated the peak summer shortfall of energy as a result of a wet cooling tower (as compared to a once-through cooling system) at approximately 1.8 percent for coal-fired plants and 0.4 percent for combined-cycle plants. This corresponds to a very short period of time, during which the output is most severely affected. The peak summer shortfalls on a national basis are estimated to be 1.7 percent for coal-fired plants and 0.4 percent for combined-cycle. EPA estimates that four coal-fired plants and five combined-cycle power plants would install cooling towers in lieu of once-through cooling as a result of this rule. That represents approximately 10 percent of new, in-scope power plants and an even smaller fraction of the total new generating capacity projected on-line over the next twenty years. EPA is confident that these summer shortfalls are negligible for power supply reliability in the regions in which the new plants will locate and for the United States power supply as a whole.

On a related note, the commenter's own analysis included as an appendix to their comments estimates that the peak summer shortfall due to wet cooling towers (as compared to once-through cooling) is negligible, and in some cases non-existent. As a result of their analysis, they assert that the performance penalty of a cooling tower for a combined-cycle power plant is between -2.3 percent and 0.7 percent. See comment Table 6 in Appendix A of the commenter's November 2000 comments.

Regarding visibility impacts, local climate change, wildlife losses from birds colliding with towers, fish losses due to loss of heated aquatic plumes to over-wintering habitats, and increased impediments to waterway navigation due to icing in northern regions, EPA notes that the commenter provides no examples nor additional information to clarify or justify the assertions. Each of these subjects represents a site-specific issue and EPA's consideration of each issue is summarized below.

Visibility impacts are controlled at existing facilities primarily through the use of plume abatement. Currently, approximately two percent of recently constructed facilities incorporate plume abatement as a design factor. Therefore, these costs are not applicable to a national rule projected to incur the costs of cooling tower at only 9 new facilities.

Local climate change is a direct result of salt drift or plume drift. To the extent that plume abatement is necessary on a national basis, local climate change will be abated also. Additionally, modern power plant facilities design their campuses to incorporate buffer areas around cooling towers. These buffers counteract the effects of salt drift and the impacts of plume drift on surrounding areas. The additional purchase of land at new power plants is a negligible capital cost when compared to the cost of installing a wet cooling tower. In addition, all modern wet cooling towers (including those modeled by EPA in its costing estimates) incorporate state-of-the-art measures to eliminate drift. Together, the

drift elimination equipment and buffer land purchases common at recent power plant projects counteract issues of local climate change to a large degree.

The issue of birds colliding with towers is negligible for a stationary tower, and no more problematic than for any other stationary structure (e.g., office building).

The issue of fish losses due to the loss of heated-aquatic plumes is moot, as a new facility would never have created a heated-aquatic plume that could be lost.

The issue of impediment of navigable waters is very similar to the local climate change and visibility issues discussed above. This is often dealt with using plume abatement (see the discussion above), land allocation, or relocation of the tower (all options available to new facilities through design refinements and considerations).

Finally, EPA notes that the final rule offers flexibility to new facilities. In addition to cooling lakes and ponds as an option for compliance with the flow reduction requirements of Track I, facilities have the option of complying with Track II. See Chapter 5 of the Technical Development Document for a discussion of means by which facilities may be able to comply with Track II and implement once-through cooling systems.

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Subject Matter Code 24.5

EEA - Estimation of Benefits

EPA's Assessment of the Expected Benefits Does not Conform to EPA's Own Guidance

EPA's guidance describes benefits analysis as a process to develop monetary values to inform the policy-making process (EPA 1999, p. 7-1). EPA's benefit-cost guidance relies primarily on techniques that transfer existing benefit estimates to new regulatory situations. Specifically, the guidance requires analysts to rank significant sources of benefits, to assess the quality of published studies, and to account for uncertainty (EPA 1999, p.7-1, 7-6, 7-8). The benefits estimates in the proposed rule meet none of these requirements. Furthermore, the guidance states that benefit values are important in helping policy-makers make direct comparisons to the costs (EPA 1999, p. 7-1). The proposed rule ignores the fundamental purpose of the analysis because it never compares estimated benefits to costs. Thus, the benefits analysis in the proposed rule has no relevance for assessing whether the rule is good
policy.

The general approach for assessing the benefits of environmental policies, as stated in the guidance, requires three steps: (EPA 1999, p. 7-5)

1. Identify potentially affected benefits categories.
2. Quantify significant physical effects to the extent possible, working with risk assessors, ecologists, physical scientists, and other experts.
3. Estimate the values of these effects, using studies that focus on the effects of concern or transferring estimates from studies of similar impacts.

The EEA ignores the guidance requirements for each of these steps.

a. Step 1: Identify Potentially Affected Benefits Categories

EPA's guidance requires first evaluating which effects are likely to be significant in the overall benefit analysis. The purpose of this step is to focus analytical resources on the most important categories of potential benefits. The guidance defines significant benefits category as whether there are likely to be observable changes in the benefits category as a result ofimplementing a policy option (EPA 1999, p.7-6).

The EEA fails to provide any rationale for the benefit categories that are included and excluded or to establish links between identifiable environmental outcomes of the policy and monetary benefits. Because the proposed rule provides no documentation for how decreased biological losses increase commercial and recreational fish catch, it is impossible to assess the benefits claimed.

b. Step 2: Quantify Significant Physical Effects

EPA's guidance requires economists to communicate with other experts to ensure that the information provided is both adequate to support the benefits analysis and includes a discussion of the uncertainty of the estimates of physical effects (EPA 1999, p. 7-7). One of the most important pieces of information required to document aquatic benefits is the relationship between decreased losses from impingement and entrainment and increases in angler catch. It is not sufficient just to document an increase in mortality. There must be a link between the increase in fish mortality and a decrease in services from the fishery. An obvious link between fish mortality and decreased resource services is a change in fishery catch. If there is no significant change in catch, then the change in mortality is not relevant to recreational fishing and does not cause a change in the value of the fishery. EPA's analysis does not discuss the critical link between environmental effects and angling benefits. Rather, the proposed rule merely cites estimated physical effects from five studies for the sites in those studies.

EPA's guidance notes that baseline conditions can have a profound influence on the measurement and interpretation of results (EPA 1999, p. 5-3). Suppose the study site has excellent baseline water quality, excellent fish habitat, and healthy fish populations of highly valued fish species. Conversely, suppose the policy site has poor baseline water quality and fish populations. Any benefits estimated for the policy must be defined in relation to changes from the actual baseline conditions at the policy site, not the study site. Thus, using unadjusted benefits estimates from the study site will overstate benefits. In fact, as we note below, differences in baseline conditions between the sites may make the original study an inappropriate source of benefit-transfer estimates for the policy site. At a minimum, analysts would have to modify the original study estimates to reflect differences in the two situations. EPA's benefits analysis fails to discuss how either the baseline conditions or policy-induced changes at the study sites differ from those of the policy sites.

Baseline CWIS technologies also will have a large impact on the magnitude of quantifiable benefits. The additional benefits of technologies and modifications typically decline as more stringent controls are added onto CWIS with existing fish protection technologies. Thus, an analysis of the costs and benefits of alternative BTA requirements must be performed relative to the same technological baseline. EPA's cost analysis assumes that almost all future electric generating facilities would install closed-cycle cooling even in the absence of the proposed rule. In contrast, EPA's benefits assessment is performed using studies based on CWIS with a wide range of baseline technologies. Thus, EPA's assessments of the "potential" benefits of the rule, as well as its estimates of the potential impingement and entrainment losses of new facilities, are grossly overstated since they are based on facilities with much less stringent technologies.

c. Step 3: Estimate the Value of the Effects

EPA's guidance requires analysts to assess the quality of studies used to transfer benefit estimates to expected policy outcomes (EPA 1999, p. 7-1). The guidance provides specific information to assist in evaluating the methods used in existing studies (EPA 1999, p. 7-15 to 7-34). The guidance also describes the attributes necessary to assess the applicability of a study (EPA 1999, p.7-33). Finally, the guidance requires that benefits analysts clearly describe the sources of all values used and assess the uncertainty associated with value estimates (EPA 1999, p. 7-8). It is evident that the proposed rule does not comply with the guidance requirements in assessing or using existing benefits studies.

According to EPA's guidance, an important step in transferring benefits is to identify relevant studies

after reviewing candidates in the available literature for applicability and quality (EPA 1999, p.7-33). To determine the applicability of the original study for transfer, analysts should compare resource characteristics that effect value. Specifically, physical characteristics, services provided, and number and quality of available substitute sites are important determinants of benefits. For example, suppose a site is located on a typical warm-water river and there are numerous comparable fishing opportunities on five similar rivers located within 20 miles of the site. In contrast, suppose an alternative site is located on a well-managed trout stream and the only other comparable fishing opportunity is located 50 miles away. A decrease in catch at the site with many substitute recreational alternatives will have a much smaller effect on anglers than a similar decrease in catch at the site with few recreational substitutes. Thus, a study that estimates benefits from increased catch at one of these sites may not provide sufficiently comparable values to transfer to increased catch enefits at the other site.

The guidance requires that analysts assess not only the comparability of the resources involved, but the quality of published studies, as well (EPA 1999, p. 7-1.). Several economists (Smith, 1992; Brookshire, 1992; Desvousges, Naughton, and Parsons, 1992; McConnell, 1992; and Boyle and Bergstrom, 1992) recommend reviewing existing studies for their scientific soundness because existing studies have varying levels of quality. In transferring value estimates from a previous study to a different site, the analyst also transfers the assumptions and flaws of the methodology in the original study.

In some cases, a study cannot be used for benefits transfer simply because not enough information is available to properly evaluate it. Analysts must be able to assess the quality of the data and the suitability of the statistical analysis used in the study. This appraisal is the basis for determining the implications for uncertainty in transferring the results to a new context. The poorer the comparability in resources between study sites and policy sites and the poorer the empirical basis for estimates in the original study, the greater the uncertainty in the imputed benefit estimates for the policy site. EPA follows none of these requirements in their discussion of the studies that provide benefits estimates in the rule.

EPA Response

The main thrust of this comment is to provide EPA with a primer on how to do a benefits analysis. The commenter also points out that the Agency had not developed a quantitative benefits analysis and, as such, had not conformed with its own guidance. Further, the comment points out that because the benefits analysis did not generate relevant quantitative information, that it could not be used to facilitate an informative comparison of benefits to costs. The comment then proceeds at length to discuss some basic procedures for how benefits should be estimated, citing EPA's 1999 guidelines regarding the three steps of conducting a benefits (identifying, quantifying, and monetizing benefits).

As noted in responses to prior comments, EPA acknowledges that is has not developed a quantitative benefits analysis for the New Facilities rule, but disagrees with the statement that it has thereby failed to conform with its own guidance. Consistent with these guidelines and standard professional best practices, it is the Agency's intent to develop economic analyses that are as complete and reliable as is feasible for its rulemakings. However it is neither required or prudent for EPA to develop empirical estimates of benefits where data limitations and/or other critical constraints preclude doing so in a

credible and reliable manner. Because key gaps exist in the types of information required to conduct a more comprehensive benefits analysis, the Agency has been unable to appreciably expand upon the economic portions of its benefits analysis for the final new sources rulemaking.

EPA agrees that a benefits analysis should adhere to professionally-defined best practices in terms of developing the proper analytic steps, accounting properly for baseline conditions, and using established principals for the use of benefits transfer techniques. The Agency strives to suitably adhere to these practices and procedures. Indeed, it is because of the data limitations associated with the new facility rulemaking under section 316(b) that EPA believes that the credible execution of these steps and practices would have been infeasible and lacking in credibility. Hence the Agency has not been able to develop a quantified set of benefits estimates. To proceed to do a full benefit analysis without the proper data and methods would have been contrary to best professional economic practices.

In regard to the comment's discussion of the three steps involved in generating a benefits estimate, the Agency recognizes that these three steps are the logical elements of a quantitative analysis. EPA follows these steps when data and other relevant circumstances enable it to develop reliable quantitative estimates of benefits.

Comment ID 316bNFR.068.334

Subject Matter Code	24.5
EEA - Estimation of Benefits	

Author Name Terry M. Hogan & David E. Bailey

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EPA's Anecdotal Information on Benefits is Incomplete and Misleading

The studies included in the proposed rule fail to satisfy the agency's own standards for benefits transfer. The proposed rule cites only five studies that estimate the physical effects of CWIS (Rule, p. 49104). .EPA's was of benefits studies does not follow procedures specified in their own guidance. In particular:

* EPA fails to evaluate the quality of the analysis and reliability of methods used in the reference studies.

* EPA fails to show that the studies cited in the proposed rule are relevant to the facilities that will be affected by the policy or how estimates should be modified to account for differences with policy sites.

* EPA fails to document reported values, citing values that do not exist in the studies themselves.

* EPA fails to evaluate sensitivity of results to assumptions and to provide decision makers with an assessment of uncertainty in the estimates.

There are numerous published studies providing angling values for a variety of species, locations, and types of water bodies. The proposed rule provides no motivation for choosing the particular studies selected from the large literature on aquatic benefits. Appendix A provides a detailed assessment of each of the studies used by EPA to evaluate the benefits of the proposed 316(b) rule. The Appendix A assessment raises many concerns with the studies chosen by EPA to consider the benefits of the proposed rule. EPA should develop a more thorough assessment of benefits based on its own benefits evaluation guidelines.

EPA Response

The comment suggests that the Agency conducted an improper or inaccurate "benefits transfer" in developing quantitative estimates of the benefits of the proposed rulemaking. Since EPA has not developed quantitative estimates of benefits for the proposed New Facilities rule because of critical limitations in the data, the Agency does not consider the comment to be directly relevant to the rulemaking.

In general terms, EPA agrees with the observation that when it uses a benefits transfer approach to estimate quantitative benefits, that the process entails some interpretation on the part of the Agency of the available economics literature. Accordingly, it is EPA's intent and practice to ensure -- when conducting a benefits transfer -- that the underlying studies applied are of suitably high technical merit and are relevant to the resource impacts associated with the regulatory policy.

The purpose of the five studies cited in Chapter 11 of the EEA is to illustrate examples of what has occurred in the past in terms of I&E impacts at existing CWIS. A benefits analysis (whether using benefits transfer or primary research) was not pursued for new facilities, in large measure precisely because EPA was unable to evaluate the quality of the analysis and reliability of methods used in the industry-prepared reference studies. The commenter also stated that EPA failed to show that the studies cited in the proposed rule are relevant to the facilities that will be affected by the policy. Again, the Agency did not do a benefits transfer for the new facilities proposed rule in large measure due to this very reason (i.e., because the location of new facilities is unknown and therefore EPA was not able to match future facilities with existing facilities).

The commenter also states that "there are numerous published studies providing angling values for a variety of species, locations and types of water bodies" and that the "proposed rule provides no motivation for choosing the particular studies selected from the large literature." EPA agrees that there is a large body of literature covering empirical research on the economic values associated with recreational angling. If the Agency believed that it were feasible to conduct a reliable, quantitative assessment of benefits for the new facilities rule, then it would have considered the full range of prior research in order to identify which studies were most applicable in a benefits transfer to the species and locations impacted by new facility I&E. However, the Agency must again point out that it is not feasible to develop a reliable quantitative benefits assessment for new facilities, and that its intent in describing the 5 studies included in Chapter 11 of the EEA is to provide an indication of I&E impacts as studied at existing facilities (and not as a benefits transfer to potential new facilities).

The commenter then mentions that "Appendix A provides a detailed assessment of each of the studies used by EPA to evaluate the benefits of the proposed 316(b) rule. The Appendix A assessment raises many concerns with the studies chosen by EPA to consider the benefits of the proposed rule." The commenter here apparently is referring to Appendix A in a report by Harrison and Schatzki (November, 2000). If EPA conducts a benefits transfer in the future that may draw upon any of the five studies cited in Appendix A, then the Agency will take into consideration the discussion of the studies provided in that review.

The commenter raises a concern that sensitivity analyses are not provided to aid decision-makers in making an assessment of uncertainty in the estimates. Since EPA did not estimate benefits for the new facilities rule (because the uncertainties were so large as to be insurmountable -- for example, the Agency does not know where future facilities will be built, what their design and performance parameters will be, what types of waterbodies and aquatic ecosystems they will affect, what species (and lifestages) will be impacted through impingement and entrainment, or the type of recreational use and water quality goals associated with designated use), a sensitivity analysis is not a relevant consideration. In addition, the Agency provides a discussion on uncertainties, variabilities, and potential biases in Chapter 11 of the EEA.

The commenter also alleges that "EPA fails to document reported values, citing values that do not exist in the studies themselves." This concern is more explicitly addressed in response to comment 316bNFR..069.014, where the commenter raises the issue again but offers specific reference to values attributed by citation to Huppert (1989), and Ronafalvy et al. (1999).

Comment ID 316bNFR.068.335

Subject Matter Code	24.5
EEA - Estimation of Benefits	

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EPA's Suggestion That Nonuse Values are 50 Percent of Use Values is Based on Dated Studies and an Overly Simplistic Assessment of Nonuse Values.

EPA's proposed rule reports sample calculations of total consumer surplus that could be generated by improvements in CWIS technology (65 Federal Regulation 49105). In these calculations EPA assumes that nonuse benefits would amount to 50 percent of use-value benefits (a so-called “50 percent” rule). EPA bases this assumption on two studies that have evaluated the results of studies that have estimated both user and non-user benefits deriving from water resources (Freeman 1979; Fisher and Raucher 1984).

The estimation of non-user values is an important and particularly controversial issue. There is significant debate on the appropriate techniques for measuring such values, whether existing methodologies can measure such values, and the contexts in which such values exist. EPA assessment of nonuse benefits, however, fails to discuss these considerations. The EPA should perform a more complete and thorough assessment of whether non-user benefits should be considered in the context of 316(b) BTA evaluations, and, if so, what methods should be used to evaluate non-user benefits.

EPA’s use of the so-called “50 percent” rule approach to non-user benefits relies on studies that are over 20 years old and were only intended to provide rough estimates. The studies clearly note the limitations of the ad hoc estimate. Freeman (1979), for example, states that assuming non-user benefits are 50 percent of use benefits “is a very tenuous basis from which to estimate national nonuser benefits.” The EPA acknowledges the limitations of the 50 percent rule, stating that “the overall reliability and credibility of this type of approach is, as for any benefits transfer approach, dependent on the credibility of the underlying study and the comparability in resources and changes in conditions between the research survey and the 316(b) rule’s impact on selected site” (EPA 2000, p.11-20). The EEA, however, fails to assess the applicability of the studies underlying the Freeman (1979), and Fisher and Raucher (1984) studies, and fails to develop methods to consider resource comparability in the benefit transfer process.

Given the significant debate over non-user valuation methods, significant advances in contingent valuation methodologies over the past 20 years, and significant advances in developing benefit transfers that account for site-specific factors affecting benefits levels, EPA’s reliance on the so-called “50 percent” rule is inadequate. EPA should perform a more thorough assessment of the applicability and magnitude of non-user benefits than was presented in the EEA.

EPA Response

This comment points out that the issue of nonuse values (also known in some literature as “passive

use" values) has sometimes been controversial, which the Agency recognizes. Further, the comments accurately note that there are limited methods available for measuring nonuse values, and that the accuracy of these methods can be debated because there are no observable market transactions or other ways to infer values using the revealed preferences of the American people.

EPA recognizes that challenges associated with the estimation of nonuse values have been widely discussed in the economics literature as well as in the context of regulatory analysis (and also in the context of natural resource damage case litigation). However, consistent with the broadly accepted view in the economics profession, the Agency believes that nonuse values are likely to exist and apply for many (if not all) of the beneficial ecological outcomes that stem from EPA regulatory actions, including enhancements to aquatic systems as can be anticipated from the proposed 316b rulemaking. There is no convincing evidence to suggest that nonuse values strictly apply to only a small set of environmental resources or only to irreversible changes in their condition. Further, even if nonuse values were thought to apply only under limited circumstances, the proposed 316b rule is likely to have beneficial impacts on species and resources of concern (e.g., threatened or endangered fish species) and thereby meet even a narrowly defined applicability test.

EPA agrees with the comments in terms of recognizing that there are no revealed preference methods available to estimate nonuse values. Nonetheless, there are a number of stated preference methods that can and have been successfully applied to develop credible estimates of nonuse values. Research using some of the early applications of the contingent valuation method (CVM, which is one type of stated preference method that has been applied by economists for nonuse value estimation) indicated that nonuse estimates derived from inadequately designed CVM survey instruments may not be wholly reliable.

Nonetheless, the body of research on stated preferences that has evolved over the past several years provides a broadening array of tools and methodological refinements that overcome many of the limitations inherent in some of the earlier applications of contingent valuation methods. For example, one stated preference method, choice questions, has evolved from a blending of CVM and conjoint analysis, the latter of which has been a standard valuation tool in marketing and transportation research for many years. Choice questions have the potential to avoid many of the shortcomings of CVM, and have a proven track record in the business economics literature. Thus, EPA believes that well designed, fully tested, and properly implemented stated preference approaches can provide useful and credible measures of nonuse values.

EPA would like to engage in a large-scale primary research effort to develop and apply state-of-the-art stated preference methods to the issue of estimating nonuse values for the ecological outcomes anticipated from 316b regulatory options. However, the Agency lacks the budgetary resources, calendar time, and faces several other constraints that make it infeasible to pursue such research within the court-imposed regulatory schedule (e.g., any stated preference survey instrument would be subject to OMB review and approval under the federal Paperwork Reduction Act, an often lengthy and costly proposition in itself). Accordingly, the EEA discusses the viable alternative approach of benefits transfer. Chapter 11 of the EEA presents two types of benefits transfer approaches that the Agency has relied upon in past regulatory analyses, and describes the findings of studies used in these exercises. While no estimates of nonuse benefits are made in the EEA for new facilities, the discussion provided by the Agency establishes the appropriate concepts, approaches, and caveats that

would be associated with the benefits transfer approach that would need to be used if the Agency were to develop such estimates. The underlying studies are somewhat dated, but no applicable newer studies are available that refute these findings for nonuse values.

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Subject Matter Code 10.01

Regulatory Framework Options

Limitations of EPA's Evaluation of Alternatives

The EEA considers three alternative BTA requirements:

1. Proposed BTA requirements. The proposed requirements include flow, velocity and technology requirements specific to the location of the CWIS.

2. Require Estuary and Tidal River BTA for All Locations. This alternative would require that CWIS sites in any location meet the BTA requirements for CWIS in estuaries and tidal rivers. These requirements are the most stringent of all BTA requirements.

3. "Zero Flow" Requirements. This BTA requirement would require flow levels commensurate with those achieved through dry cooling systems.

EPA's Analysis of Alternatives is Too Limited

The range of BTA alternatives considered in the EEA is too limited. In a three-page chapter, the EEA sketches two alternatives to the proposed BTA requirements that would both result in significantly more stringent requirements. One alternative applies the most stringent set of BTA requirements to all facilities regardless of their location. The other alternative imposes a more stringent "zero flow" requirement on the electric generation facilities, which would require flow levels commensurate with those achieved through dry cooling systems. As a result of the increased stringency, both alternatives would result in costs that are significantly greater than the costs of the proposed alternative.

The EPA fails to consider any alternatives that would achieve the AEI goals of the 316(b) rule through less stringent requirements or more flexible means of compliance. Such alternatives could include the following:

1. Alternative Technologies. Many technologies are available to significantly reduce impingement and entrainment at significantly lower costs than EPA's proposed BTA requirement. Evaluation of the incremental costs and benefits of these technologies relative to cooling towers may reveal that these technologies provide significant biological benefits at a fraction of the social cost of cooling towers.

2. Case-by-case BTA. Allowing facilities the flexibility to make a case-by-case BTA determination would lead to the selection of BTA technologies that provide a proper balancing of the costs and benefits of alternative technologies.

The EPA thus considers on two alternatives to its proposed requirements. This assessment of alternatives is too limited to provide useful information on whether the proposed rules are the best regulatory alternative. In addition, EPA's approach fails to comply with EPA and OMB guidelines, as

discussed below.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

The EA was used to support costing for the proposed new facility rule. EPA selected several technologies that were reasonable, given data available for new facilities, for purposes of performing cost analyses for new facilities. EPA's record as a whole fully considers available data on technologies that can be used to address the location, design, construction and capacity of cooling water intake structures. EPA acknowledges that there are additional technology alternatives that could achieve the AEI reduction goals of this rule. Under the two-track approach facilities are able to determine BTA most appropriate for site-specific conditions as long as they meet the requirements set in Section 125.84 of this rule.

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Subject Matter Code 24.4

EEA - Estimation of Regulatory Alternative Costs

EPA's Analysis of Alternatives Does Not Comply with EPA and OMB Guidelines

The EPA's analysis of the economic impact of 316(b) regulatory alternative does not comply with the basic guidelines for regulatory assessments developed by both EPA and OMB. The Administration has enshrined careful incremental analysis of well-chosen regulatory alternatives in Executive Order 12866 and in guidance documents issued by the OMB advising agencies how to conduct economic analysis of regulations. About one-third of OMB's 1996 "Best Practices Guidance" on economic analysis addresses how to assess alternatives. To comply with Section 638 of the Fiscal Year 1999 Omnibus Appropriations Act and Section 628 of the Fiscal Year 2000 Treasury and General Government Appropriations Act, OMB released guidelines in March 2000 standardizing the measurement of costs and benefits. These guidelines state that agencies "should especially consider all appropriate alternatives for the key attributes or provisions of the rule." (Lew 2000, p. 3).

Analysis of regulatory alternatives is critical to a proper evaluation of the proposed regulations. Even if the overall net benefits of the proposed regulations were positive—that is, the overall benefits exceeded the overall costs—it would be important to determine whether significant elements of the proposed regulations pass a benefit-cost test. That is, for any given provision, the costs of that provision may outweigh the benefits. In this context, it would be important to consider the alternative regulatory approaches to achieving the AEI goals of 316(b) aside from EPA's proposed regulations.

As discussed above, the economic analysis in support of the 316(b) regulations has virtually no discussion or analysis of alternatives. The EPA's neglect of other alternatives ignores the letter and spirit of Administration policy. President Clinton's Executive Order 12866 states that regulatory agencies "shall provide" to the Office of Information and Regulatory Affairs:

"an assessment, including the underlying analysis, of costs and benefits of potentially effective and reasonably feasible alternatives to the planned regulation, identified by the agencies or the public (including improving the current regulation and reasonably viable nonregulatory actions), and an explanation why the planned regulatory action is preferable to the identified potential alternatives."<FN 6>

The EPA should analyze "potentially effective and reasonably feasible alternatives," particularly less stringent alternatives than those proposed.

The EPA's analysis is also inconsistent with OMB's recent directive on benefit-cost analysis, which states, "You should analyze the benefits and costs of different regulatory provisions separately when a rule includes a number of distinct provisions. If the existence of one provision affects the benefits or costs arising from another provision, the analysis becomes more complicated, but the need to examine provisions separately remains[emphasis added]."<FN 7> The EPA's assessment has not analyzed costs and benefits of individual provisions separately. Examination of the costs and benefits of the flow

requirements, velocity requirements, and technology requirements of the EPA's proposed 316(b) regulations on an individual basis may reveal important differences in the cost-effectiveness of these individual requirements.

The EPA's approach is also not consistent with the recently updated Economic Guidelines, which state that (EPA 1999, p.10-4):

The incremental benefits, costs and net benefits of moving from one regulatory alternative to more stringent ones should also be presented. This should include a discussion of incremental changes in quantified and qualitatively described benefits and costs. It is sometimes necessary to evaluate all combinations of options and alternatives when key sources of benefits and costs of a policy are affected by more than one option.

These guidelines provide important guidance in the determination of the appropriate level and design of 316(b) requirements in order to achieve net welfare gains to society. The process of maximizing net welfare gains to society, as well as ensuring that those gains are positive, requires a full consideration of alternative regulatory requirements and the development of estimated costs and benefits for each alternative. EPA's failure to incorporate a complete analysis of alternatives in the EEA is a significant omission.

EPA Response

EPA disagrees with the commenter's claim that EPA's analysis of alternatives does not comply with EPA and OMB guidelines. EPA believes that the 316(b) rule is in compliance with the guidelines for regulatory assessments developed by both OMB and EPA. Consistent with these guidelines, the Agency has developed an economic analysis that is a complete as possible.

EPA considered and analyzed several technology-based regulatory options to determine the best technology available for minimizing adverse environmental impact for new facilities. All of these options were analyzed and compared with the current requirements applied to NPDES permits for existing facilities with cooling water intake structures. Although the Agency considered numerous regulatory options during rule development, the primary options considered in development of the final rule include: (1) technology-based performance requirements for different types of waters, with intake capacity limits based on closed-cycle recirculating wet cooling systems required only in estuaries, tidal rivers, the Great Lakes, and oceans; (2) national technology-based performance requirements for all waterbodies, with flow reduction commensurate with the level achieved with closed-cycle recirculating wet cooling; (3) national technology-based performance requirements for all waterbodies with a near-zero intake level (based on dry cooling); and (4) a case-by-case, site-specific approached based on the 1977 draft guidance document. In addition to these options, EPA also considered variations on each of the technology-based options using on a two-track permitting approach. The two-track approach establishes a specific set of technology-based performance requirements that a permittee can implement that reflect best technology available for minimizing adverse environmental impact; this approach also provides permittees with flexibility to demonstrate that an alternative set of requirements achieves the same level of performance. For all the options except for those based on dry cooling, EPA also considered requiring a design through-screen velocity

of 0.5 ft/s, location- and capacity-based flow restrictions proportional to the size of the waterbody (such as a requirement for streams and rivers allowing no more than 5 percent withdrawal of the mean annual flow), and design and construction technologies to minimize impingement and entrainment and maximize survival of impinged organisms.

Chapter 10: Alternative Regulatory Options in the Economic Analysis document discusses four of these regulatory options that EPA considered. Three of those four alternative options are less stringent than the final rule.

EPA also disagrees with the comment that the analysis of benefits and costs is insufficient. EPA has assessed the costs and benefits of the final rule and the total annualized costs are relatively low, under $50 million per year. The benefits are presented in Chapter 11 of the EA and elsewhere in the comment response document.

Comment ID 316bNFR.068.338

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Subject Matter Code 10.04

Site-specific Permit Flexibility

The Regulatory Approach Should Allow Site-Specific Comparisons

EPA has proposed a major shift in the approach to establishing 316(b) determinations. Rather than provide 316(b) determinations on a site-specific basis, the proposed rule would require national minimum technology-based requirements.

The national technology minimum approach largely ignores the substantial variability in the costs and benefits of adopting specific technologies at different locations. Although the proposal would provide some variability in control requirements, the requirements would be uniform for large categories of potential locations. This approach does not appropriately consider costs and benefits when determining which technology to install at specific locations.

We conclude that allowing 316(b) determinations to be made on the basis of site-specific evaluations would produce more desirable results in three principal respects:

1. First, the site-specific approach would produce greater fish-protection and other environmental benefits for a given level of costs.

2. Second, the site-specific approach would impose lower costs to achieve a given level of fish protection and other environmental benefits.

3. Third, the site-specific approach would provide appropriate incentives for new facilities to locate outside environmentally-sensitive areas.

EPA Response

EPA adopted a minimum national technology based standard approach with a two-track Option. The goal is to provide flexibility and ease of permitting where the applicant meets requirements that represent Best Technology Available for minimizing adverse environmental impact, while also giving the option of evaluation and use of alternative technologies that will meet the same reduction of entrainment and impingement. EPA believes that despite varying benefits at different locations, the requirements of this rule for new facilities are well demonstrated, economically practicable, and result in acceptable no-water quality environmental impacts. The large percentage of new facilities planning to meet the requirements supports this determination. Therefore, EPA does not believe that it is reasonable to engage in lengthy permit negotiations for the vast majority of new facilities.

The cost advantage of the national minimum technology based requirement is that the site investigation costs are substantially reduced, as is the time required for baseline source water characterization prior to permitting. The final cost analysis is described in Section VIII of the Preamble, and details are

reported in Chapters 6 and 7 of the Economic Analysis and in the Technical Development Document.

The two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the “fast track” (Track I), or by demonstrating the same level of performance as the Track I requirements under the “demonstration track” (Track II).

Another option, defined under Section 125.85 an alternative to Track I and II states that if "the EPA Administrator determines that the data specific to the facility indicate that compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs EPA considered in establishing the requirement at issue". As described in 125.85 (b) "The burden is on the person requesting the alternative requirement to demonstrate that alternative requirements should be imposed."

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Subject Matter Code 10.04

Site-specific Permit Flexibility

The Site-Specific Approach Should Allow an Option to Install Pre-Approved Technology to Reduce Administrative Costs

The cost of developing and implementing a site-specific approach—including the costs of delay in getting facilities constructed—may not be justified in all situations. It would be useful to include an option to allow a facility to install pre-approved highly protective CWIS technology in the interest of reducing administrative costs and reducing the delay in obtaining a permit. Such a provision would not detract from the gains from the site-specific approach—which the facility owner could select—and would have the advantage of providing greater flexibility. It is appropriate to give the facility owners the option because they would be in the best position to judge whether the added costs of developing site-specific information justify the added gains from a tailored site-specific determination.

EPA Response

EPA agrees that a facility should have the option of installing a highly protective technology in order to avoid delays and costs associated with site specific biological characterization. "Highly protective technology" represents the statutory standard best available technology for minimizing adverse environmental impact.

Under the final rule, EPA has adopted a two-track approach. Section 122.21 details the information required in order to submit an application. The Source Water Baseline Characterization required under Track I includes existing and available data (the permitee may supplement the data using newly conducted field studies if they choose to do so). The remaining requirements under Track I are technology based and are designed to avoid delays in permitting new facilities.

Under Track II, the applicant has the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements for capacity, design velocity, and design and construction when applied to a shoreline intake at the new facility site. Proportional flow requirements also apply under Track II. Taking Track II requires a more extensive Source Water Baseline Characterization in order to demonstrate that requirements are being met with an alternative technology.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

BTA Determinations Should be Based upon the Criterion of Maximizing the Net Benefits of Fish Protection Alternatives

EPA also has proposed a major shift in the criterion for determining BTA. EPA proposes to change from a criterion based upon comparison of costs and benefits to a criterion that compares costs to the revenues from the facilities. This "affordability" test is not a sufficient test from an economic perspective for determining what technology should be BTA.

* Affordability does not provide a way of systematically evaluating the environmental benefits and costs of alternative technologies.
* Affordability ignores consideration of the costs and benefits of BTA alternatives.
* Affordability ignores consideration of the incremental benefits and incremental costs of increasingly stringent (and expensive) alternatives.
* Affordability ignores other impacts of cooling water intake technologies.

We conclude that BTA determinations should be based upon a benefit-cost test. This test would involve determining the applicable fish protection alternatives, assessing their incremental costs and benefits in dollar terms to the extent feasible, determining major uncertainties in the analysis, assessing whether relevant costs or benefits have not been quantified, and developing a BTA choice that is likely to maximize net benefits in the particular case. This cost-benefit test would identify the best technology from an overall societal perspective.

This cost-benefit test is superior to the current "wholly disproportionate" test for BTA determinations that were developed more than twenty years ago. The "wholly disproportionate" test is not consistent with the economic objective of maximizing the net benefits from BTA determinations. The test appears to be motivated by an unsubstantiated assumption that measured benefits are consistently and significantly understated relative to costs, perhaps based upon limitations in benefit assessment methodology. Whatever the motivation, advancements in benefit assessment methodologies and empirical studies in the last two decades provide ample basis for using an appropriate cost-benefit test.

EPA Response

This comment is identical to comment 316bNFR.068.140 in comment category 18.2. Please see response to comment 316bNFR.068.140.

Comment ID 316bNFR.068.341

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Subject Matter Code 24.0

Economic and Engineering Analysis (EEA)

EPA's Engineering and Economic Analyses

EPA Should Reevaluate Its Cost Analyses in Light of Various Concerns

The EEA provides estimates of the potential costs of the proposed regulations that appear to suffer from several major concerns. These concerns include an understatement of the number of facilities subject to the regulation, understatement of the full costs of closed-cycle cooling water systems, and disregard for some potential options that would be more cost-effective.

We recommend that EPA reevaluate its cost analysis in light of these concerns. The objective should be to develop a reliable methodology for estimating the costs of the proposed alternative as well as the costs of regulatory alternatives.

EPA Response

The issues raised in this comment are identical to those of comment 316bNFR.068.141 above. Therefore, please see the response to comment 316bNFR.068.141.

Comment ID 316bNFR.068.342

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Subject Matter Code 24.5

EEA - Estimation of Benefits

EPA Should Complete Its Benefits Analyses

The EEA does not provide an analysis of the potential benefits of the proposed regulations. Indeed, EPA's benefits analysis does not conform to the Agency's guidance for preparing benefit assessments. Although EPA's guidance indicates that the analysis should include assessments of the physical effects of the proposed regulation on recreational and commercial catch, for example, the EEA does not include such estimates. The EEA also does not provide monetary values for benefits.

The EPA should complete its benefits analyses. The complete analysis should conform to the Agency's guidelines. The objective of the benefits assessment is to provide the basis for evaluating the benefits of the proposed alternative as well as the benefits of regulatory alternatives.

EPA Response

As noted in responses to several similar comments, EPA acknowledges that it did not perform a quantitative benefits analysis for the proposed rule. In view of the data limitations and other practical constraints faced by the Agency, such quantitative analyses were not feasible. Nor would it have been prudent for the Agency to proceed with a quantitative assessment under the circumstances; this rulemaking represents an instance when a qualitative approach is most suitable. See responses to 316bNFR.068.142, and 316bNFR.068.333.

Comment ID 316bNFR.068.343

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Subject Matter Code 10.01

Regulatory Framework Options

EPA Should Prepare an Appropriate Evaluation of Alternatives

The EEA considers three alternatives: (1) the proposed national BTA standards that differ somewhat by location; (2) National BTA standards equal to the most stringent that would apply at all locations; and (3) "Zero flow" requirement. These represent too limited a set of alternatives. Neither of the two alternatives is less stringent than the proposed regulations. Moreover, the discussion of even these limited alternatives is cursory. The analysis of alternatives does not comply with Agency guidelines.

The EPA should expand its evaluation of alternatives for the proposed rule. The EPA requests comments on a wide range of regulatory alternatives. EPA's analysis should provide information on a sufficiently large number of these alternatives so that it is able to make (or explain) its choices. At the very least, the analyses should include assessments of the costs, benefits, and other effects of the site-specific approach as an alternative to the national minimum technology-based approach.

EPA Response

Under the two-track approach adopted today Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. A facility can thereby consider any available technology for implementation as long as the requirements of Section 125.84 are met. EPA believes this approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing new facilities.

See also response to 316bNFR 068.336.

Comment ID 316bNFR.068.344

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Subject Matter Code 23.5

Executive Orders

EPA Should Comply with the Requirements of Executive Order 12866

Executive Order 12866 requires agencies to prepare economic analyses of potential regulations. The EEA does not conform to the requirements of Executive Order 12866 for reasons that include the following:

* The EEA does not document that the potential benefits to society justify the potential costs.
* The EEA does not document that the proposed regulations would maximize net benefits to society.
* The EEA does not show that the EPA has considered the most important alternative approaches.

The EEA should be completed and revised to comply with these and other requirements of Executive Order 12866.

EPA Response

This comment is a duplication of comment 316bNFR.068.144 above. Please see response to comment 316bNFR.068.144.

Comment ID 316bNFR.068.400

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Subject Matter Code 9.3

Documentation of I & E Impacts

EPA relies, in the preamble to its proposed § 316(b) rule for new facilities, on a very cursory summary of environmental impacts of CWISs at a few electric power plants, located mostly on estuaries. Upon closer examination, however, the experiences at these plants do not support the proposed rule. These plants do not support the proposition that cooling water intakes are causing serious damage to fish populations but do support the proposition that case-by-case application of § 316(b) has, on the whole, proven a satisfactory way to deal with entrainment and impingement.

EPA Response

Although this is a technology-based rule, the Agency used the best data available concerning impacts of cooling water intake structures to illustrate the effects of these structures. The Agency disagrees with the commenter that plants identified by EPA do not support the proposition that cooling water intakes are causing cognizable damage to fish populations. Existing and historical studies provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. In addition, EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial number of organisms are impinged and entrained by cooling water intakes. EPA believes that the documented evidence of the impacts of cooling water intakes in a variety of different habitats and water bodies supports the need for a national rule.

For a further discussion of the points raised by this comment please see Response to Comments 316bNFR.056.005, 316bNFR.068.050, and 316bNFR.066.008, and 316bNFR.068.090 as well as sections III and VI.B of the preamble.

Comment ID 316bNFR.068.401

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Subject Matter Code 9.3

Documentation of I & E Impacts

San Onofre Nuclear Generating Station (SONGS)

Kelp Bed Impacts

EPA's preamble to the proposed rule includes a distorted description of alleged impacts of the San Onofre Nuclear Generating Station (SONGS) and ignores significant advances in fish protection that were developed and installed there. For example, EPA claims that "the operation of cooling water intake structures resulted in a 60 percent (80-hectare) reduction in the area covered by moderate to high density kelp." 65 Fed. Reg. 49,073 col. 3. But the kelp bed impacts are discharge issues, not intake issues, and are not related to entrainment and impingement. It is not clear why EPA is including discharge issues in this § 316(b) document.

Moreover, even if the kelp bed impacts were pertinent to the proposed rule – which they are not – the reports relied on and quoted by EPA do not take account of the full data set now available for statistical analysis. Instead, EPA relies on only two pre-operational surveys of the adjacent kelp beds and three operational surveys, all of which were conducted in the early and mid-1980s. Since these surveys were published, Southern California Edison (SCE), in fulfillment of its NPDES permit marine monitoring responsibilities, has gathered at least 11 more years of kelp bed data. The more recent data were last extensively evaluated in 1994 and 1975, and at least 18 more surveys were incorporated into that updated impact analysis. SCE prepared a final kelp analysis update report in 1995 (Dean et al. 1995).

The actual area of kelp impact was determined more recently to be "substantially less," according to an independent scientific review panel that reviewed 1995 SCE kelp data. A SCE kelp analysis update report estimated the impacts to be between 48 and 110 acres, not the 200 acres estimated in 1989 (Dean et al. 1995). The Regional Water Quality Control Board, San Diego Region, reviewed these discharge-related kelp bed impacts in 1991 in a NPDES Cease and Desist prehearing. The Board concluded, by an 11 to 0 vote, that the operation of the San Onofre Nuclear Generating Station was not in violation of its discharge permits.

Fish Impacts

EPA cites an "indication" of a 17 percent loss in abundance and a 33 percent decline in fish biomass in kelp beds near the San Onofre Nuclear Generating Station relative to control populations. 65 Fed. Reg. 49,073 col. 3. For example, EPA says that "fish living close to the bottom of the San Onofre kelp bed experienced a 70 percent decline in abundance. Fish living in the water column in the impact areas had a 17 percent loss in abundance and a 33 percent decline in biomass relative to control populations. The abundance of large invertebrates in kelp beds also declined for many species, particularly snails." 65 Fed. Reg. 49,073 col. 3. But these changes in kelp bed fish populations have not been attributed to intake losses and are, therefore, irrelevant to a § 316(b) discussion.

Moreover, EPA points out these decreases in abundance and biomass of some species but does not mention increases in other species. Nor is the change in local fish densities shown to be attributable to intake effects. To the contrary, the study cited by EPA concluded that "losses of adult fish in the plant cannot account for much of the observed local declines." Murdoch et al. 1989, p. 181 (DCN:1-5013-PR).

Most significantly, the SONGS § 316(b) demonstration was analyzed in 1994 by EPA's consultant, Science Applications International Corporation (SAIC), which submitted a report titled "Review of Southern California Edison, San Onofre Nuclear Generating Station 316(b) Demonstration, Final, June 22, 1994" (SONGS Study). SAIC concluded that the station's CWIS was "best technology available" and thus in compliance with § 316(b):

The area in the vicinity of the intakes and discharges from SONGS contain populations or communities of organisms, including shellfish and fish that remain viable and capable of self-propagation. These populations or communities are characterized by diversity, the capacity to sustain themselves through cyclic seasonal changes, the presence of necessary food chain species, and an apparent lack of domination by pollutant tolerant species.

SONGS Study at 4-1. Second, the SONGS Study found that "the plant incorporates intake water technologies for the purpose of minimizing adverse environmental impacts (relevant to 316(b) considerations)" and recommended issuance of SONGS' discharge permit, subject to conditions requiring further monitoring, study of methods to reduce impingement and entrainment, and continuation of SONGS' initiatives to restore wetlands and study the option of an artificial kelp bed. SONGS Study, pp. 4-2 to 4-3.

Following the recommendation of EPA's contractor, an EPA Region IX official made a specific finding in SONGS' 1994 permit that its intake structure was BTA.

EPA Response

EPA acknowledges that much of the turbidity in the vicinity of SONGS is related to the effects of the discharge rather than the intake and that this is one of the significant factors affecting the reduction of the kelp beds. The Agency does not agree that the turbidity alone is the factor responsible for the impacts documented to be occurring at SONGS. EPA also disagrees with the commenters position regarding declines in kelp bed fish and shellfish populations near SONGS. As EPA has stated elsewhere in the Response to Comments, the causative factor for this phenomenon is a matter in dispute.

With respect to the commenters point that the plant has incorporated intake water technologies for minimizing adverse impacts (relevant to 316(b) determinations), EPA acknowledges that historical data from selected facilities may not reflect current impingement and entrainment rates at certain facilities, particularly if technologies and other operational measures for reducing impingement and entrainment rates at the facility have been implemented since the original study. Nevertheless, EPA asserts that the examples of environmental impact provided in the proposed rule are illustrative of the

types of effects associated with cooling water intake structures. Further, EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes.

EPA agrees with fisheries experts and resource managers that there is unavoidable uncertainty associated with managing fish populations. The Agency likewise acknowledges the difficulty in establishing a nexus between a stressor and adverse environmental impact. However, it is clear that a shift has occurred in the aquatic ecosystem and the significant anthropogenic change in the area is the operation of the SONGS facility. Also, EPA has maintained that cooling water intake structures not only cause substantial mortality within the aquatic ecosystem through impingement and entrainment, but the impact from these intakes affects the viability of aquatic resources in other ways including disrupting the natural functioning of the ecosystem. EPA is also concerned about the cumulative impacts of multiple stressors on aquatic systems including depletion of a population's compensatory reserve which can threaten that population's ability to persist in the face of the many natural and anthropogenic environmental stresses that occur. Further, EPA does not believe that cooling water intakes have an inherent right to deplete the potential compensatory reserve of fish populations. For additional discussion of the issues raised in this comment please see Response to Comment 316b.NFR.037.001.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.402

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Subject Matter Code 9.3

Documentation of I & E Impacts

D.C. Cook

EPA asserts that specific losses associated with individual steam electric generating facilities include "1 million fish lost during a 3-week study period." 65 Fed. Reg. 49,073 col. 1. EPA cites a 1985 report of the Great Lakes Research Division of the Great Lakes and Marine Waters Center at the University of Michigan, by Nancy J. Thurber and David J. Jude, entitled "Impingement Losses at the D.C. Cook Nuclear Power Plant during 1975-1982 with a Discussion of Factors Responsible and Possible Impact on Local Populations." Id., n. 13.

EPA accurately cites the data reported in the Thurber study, but incorrectly interprets the impingement that was reported as an example of adverse environmental impact. As UWAG has previously explained in earlier comments <FN 1> submitted to EPA, that was not the conclusion of the report. Likewise, the Michigan Water Resources Commission (MWRC) and the Michigan Department of Natural Resources, after they reviewed part or all of the 59 University of Michigan reports on the ten-year study of the impacts of the Cook Nuclear Plant on Lake Michigan, concluded that the plant intakes were BTA. Minutes of the regular monthly meeting of the MWRC, November 19, 1987.

Viewed in the context of the Lake Michigan ecosystem, one million fish impinged in three weeks is not evidence of adverse impact. These one million fish were almost all alewives, a fish species native to the Atlantic Ocean and introduced into the Great Lakes as a result of the opening of the St. Lawrence Seaway. Originally alewives were an undesirable species in the Great Lakes. When they entered the Great Lakes, there were no natural predators to control their numbers, and the alewife population grew until there were too many for the lake ecosystem to support. In the late 1960s and early 1970s, billions of alewives died each spring and washed up on the shores of Lake Michigan. The decaying alewives caused a severe health problem, and cities like Chicago and Milwaukee spent hundreds of thousands of dollars to remove rotting alewives from city waterfronts (Greenwood 1970).

In the early 1970s, states bordering Lake Michigan began stocking predatory fish species in the lake to reduce the alewife population. When the Cook Nuclear Plant impinged the one million alewives in three weeks, the alewife population had been reduced, but it was still the most abundant species in the lake. One positive result of the reduced alewife population was the increase in yellow perch. Perch are a highly prized game fish. Alewives indirectly compete with yellow perch for food, and thus the large alewife population had suppressed the yellow perch population.

Another way of putting the impingement of alewives at the Cook Nuclear Plant into perspective (about 70 percent of the impinged fish at Cook are alewives) is to compare the impingement losses with the predation losses. Published estimates of the alewife consumption by predatory fish show that the Cook Plant annual impingement is only a fraction of that figure. Estimates of alewife biomass in Lake Michigan from 1973 to 1978 ranged from 44,900 to 114,400 metric tons (estimated biomass of

adult alewives available to bottom trawls at depths between 9 and 110 meters in Lake Michigan) (Hatch et al. 1981). Salmonid predation on alewives in the late 1970s and the early 1980s was estimated at about 25,000 to 30,000 metric tons (Stewart et al. 1981; Stewart et al. 1983). The annual total alewife impingement at Cook Nuclear Plant was about 58 metric tons (2.3 million alewives) or about 0.2% of the amount of the salmonid predation.

In short, including the Cook Nuclear Plant in the proposed rule as possible evidence of adverse environmental impact is not supported by the scientific data or the regulatory decisions made by the state and reviewed by EPA Region 5.

Footnotes

1 Comments of the Utility Water Act Group on the Revised § 316(b) Screener Questionnaire ICR and Supporting Statement, December 16, 1998.

EPA Response

Please see Response to Comment 316b.NFR.061.006 for a discussion of issues raised by this comment.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.403

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Subject Matter Code 9.3

Documentation of I & E Impacts

Ludington Pumped-Storage Plant

The proposed rule includes a distorted description of alleged impacts of the Ludington Pumped-Storage plant on forage species in Lake Michigan, and how such impacts may lead to declines in sport or commercial fisheries. 65 Fed. Reg. 49,104 col. 3. As noted in our comments-in-chief, the Ludington Pumped Storage Facility is not a steam electric plant; thus, any impact attributable to Ludington is not representative of entrainment and impingement from a steam electric plant or any other type of facility subject to § 316(b). The comparison of losses from hydroelectric facilities to losses from steam electric facilities is inappropriate and misleading, given the relatively small proportion of a waterbody withdrawn by a CWIS, in comparison to the throughput of many dams. Moreover, any connection between forage species impacts and impacts to higher trophic level species is highly waterbody-specific.

EPA compounds its error in using Ludington as an example by mischaracterizing the losses attributable to the facility. EPA claims that "impingement and entrainment losses of forage species can lead to reductions in economically valued species" and states "[t]he Ludington facility is responsible for the loss of about 1 percent to 3 percent of the total Lake Michigan production of alewife, a forage species that supports valuable trout and salmon fisheries." 65 Fed. Reg. 49,104 col. 3 (citing C. A. Jones and Y. D. Sung (1993), Valuation of Environmental Quality at Michigan Recreational Fishing Sites: Methodological Issues and Policy Applications).<FN 2> EPA's reliance on the report is inappropriate because extensive Lake Michigan fisheries studies from 1971 - 1977 failed to detect changes in fish populations near Ludington. Thus, whether Ludington is having an adverse effect on the alewife population is, at the least, debatable. Furthermore, as noted in our comments-in-chief, the cumulative effects of alewife impingement in Lake Michigan are not biologically significant, when viewed in a population context. See Part VIII.C.

Equally important, Ludington has installed a seasonal barrier net. The net has proven highly effective in excluding many fish from the intake. The net annually reduces losses of 4-5 inch alewife by 81-97%, alewife 5 inches or greater by 96-99%, and game fish by 83-94%. Indeed, the Ludington facility provides an excellent example of how fish can be effectively protected at large water flow systems by technologies other than cooling towers.

Footnotes

2 The Jones and Sung (1993) report also notes that a utility study estimated a 5.6% loss of trout and salmon in 1980 (p. 141-42). That study did not relate losses of trout and salmon to losses of alewives. Instead, the estimated 5.6% loss was attributable to turbine mortality expressed as a percentage of the 1975-1977 estimated salmonid fishery for the two county area adjoining the Ludington plant. And, as described below, Ludington has taken steps to reduce these losses.

EPA Response

EPA acknowledges that there are differences between a pump storage facility and a cooling water intake, however, the Agency does not believe that a pump storage systems is so dissimilar from a cooling water intake as to be inapplicable. Rather, EPA believes that the impacts associated with Ludington are analogous to those occurring at cooling water intakes. Other commenters agree with EPA. EPA refers to the comment submitted on November 9, 2000 by the Electric Power Research Institute (EPRI). On the subject of water withdrawals, EPRI stated "the aquatic community does not discern between the water withdrawal use - cooling withdrawals, municipal withdrawals, irrigation withdrawals, hydropower withdrawals, and instream flow withdrawals all have the same potential for an impact on the water body from which the withdrawal occurs." EPA believes that EPRI has made a worthwhile point - that water withdrawals by other types of facilities can, like cooling water withdrawals, have an impact on the water body from which the withdrawal occurs. Similar to EPRI, EPA believes that pump storage facility withdrawals are a legitimate analog to cooling water withdrawals.

With respect to the comment that the cumulative affect of alewife impingement in Lake Michigan is not biologically significant in a population context, EPA rejects the idea that only population impacts are a valid metric of adverse environmental impact. The Agency continues to maintain that population impacts are one of many ways to assess adverse environmental impact from cooling water intakes. Adverse environmental impact includes: impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries, and stress to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function. See also Response to Comment 316bNFR.061.006.

EPA acknowledges that historical data from selected facilities may not reflect current impingement and entrainment rates at certain facilities, particularly if technologies and other operational measures for reducing impingement and entrainment rates at the facility have been implemented since the original study. Nevertheless, EPA asserts that the examples of environmental impact provided in the proposed rule are illustrative of the types of effects associated with cooling water intake structures. The Agency also believes that it used the best information available for the proposed and final rule.

As EPA has stated in the Response to Comments and in the Preamble to today's rule, EPA provided a number of examples of impingement and entrainment associated with existing facilities. It is important to note that these examples were not meant to predict effects at new facilities but rather to illustrate that the number of organisms impinged and entrained by a facility can be substantial.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.404

Subject Matter Code	9.3
Documentation of I & E Impacts	

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Brunswick

EPA makes several misleading statements about Carolina Power & Light Company's (CP&L) Brunswick Nuclear Plant, located near Cape Fear, North Carolina. EPA asserts that "specific losses associated with individual steam electric generating facilities include 3 billion to 4 billion larvae and postlarvae per year." 65 Fed. Reg. 49,073 col. 1. EPA also alleges that "[a] modeling effort looking at the impact of entrainment mortality on the population of a selected species in the Cape Fear estuarine system predicted a 15 to 35 percent reduction in the species' population." 65 Fed. Reg. 49,073 col. 1. In support of both statements EPA cites Brunswick Nuclear Steam Electric Generating Plant of Carolina Power and Light Company, "Historical Summary and Review of Section 316(b) Issues," EPA Region IV, September 19, 1979. Id.

This information, which dates from the early stages of Brunswick operation, is out of date. CP&L took steps many years ago to address the alleged impacts. Although no adverse environmental impact would have occurred at the Brunswick facility even without mitigation, CP&L installed mitigation measures in the 1980s. These include a diversion fence at the mouth of the intake canal (installed in 1982), fine mesh screens (1983 and 1987), and a fish return system. Studies conducted since the installation of these mitigation measures indicate that they have significantly reduced entrainment.

Also, the loss of 3 to 4 billion larvae cited by EPA is no longer a valid estimate of losses attributable to Brunswick's intake structures. These losses do not take account of intake technologies used to reduce entrainment of larvae. Technologies and operational measures used to reduce entrainment at the plant include both seasonal flow minimization, which the facility agreed to undertake, and installation of the above-mentioned fine-mesh traveling screens and fish return system. Indeed, according to an attachment to the Region 4 report that EPA cites, the Region 4 Regional Administrator, discussing the proposed fine-mesh screens, stated in 1980: "I am extremely pleased that the new technology will make possible the high degree of protection to the estuary." EPA Region IV (1979) (DCN:1-5065-PR). Reductions in entrainment of total organisms as a result of the combination of voluntary flow minimization and fine-mesh screens ranged up to approximately 90 percent, depending on species and life stage. See CP&L, Brunswick Steam Electric Plant Cape Fear Studies, Interpretive Report (CP&L, New Hill, N.C. 1985).

Thus EPA has used extremely outdated information to characterize impacts from the Brunswick Station, even though UWAG had in the past informed EPA that its information was misleading and inaccurate.<FN 3>

Footnotes

3 See Comments of the Utility Water Act Group on the Revised § 316(b) Screener Questionnaire ICR and Supporting Statement, December 16, 1998.

EPA Response

EPA disagrees with the commenter that no adverse environmental impact would have occurred at Brunswick even without mitigation as the statement is both conclusary as to what constitutes adverse environmental impact and an assertion unsupported by any data. Historical studies like those documented at Brunswick provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. EPA acknowledges that historical data from selected facilities may not reflect current impingement and entrainment rates at certain facilities, particularly if technologies and other operational measures for reducing impingement and entrainment rates at the facility have been implemented since the original study. Nevertheless, EPA asserts that the examples of environmental impact provided in the final rule are illustrative of the types of effects associated with cooling water intake structures. The Agency also believes that it used the best information available for the final rule.

As EPA has stated in the Response to Comments and in the preamble to today's rule, EPA provided a number of examples of impingement and entrainment associated with existing facilities. It is important to note that these examples were not meant to predict effects at new facilities but rather to illustrate that the number of organisms impinged and entrained by a facility can be substantial. For additional discussion of issues raised in this comment please see Response to Comment 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.405

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Subject Matter Code 9.3

Documentation of I & E Impacts

Hudson River Stations

The Hudson River Stations have been the subject of some of the most intensive and long-term § 316(b) studies ever undertaken. EPA cites one of the many articles <FN 4> on the Hudson River projects for the proposition that "[s]tudies of entrainment at five Hudson River power plants predicted year-class reductions ranging from 6 percent to 79 percent depending on the fish species." 65 Fed. Reg. 49,073 col. 1.

These statements, while accurately reflecting what is presented in the article, do not reveal the limitations of the studies that produced the data. Properly understood, the data do not support EPA's belief that power plant impingement/entrainment effects are a potential source of AEI. The studies generated projected entrainment conditional mortality rates, which are estimates of percent reductions in the abundance of a particular year-class remaining. For example, in the Hudson River example, the estimates supposedly predict the juvenile percent reduction, once the species are no longer vulnerable to entrainment.

The Hudson River estimates do not necessarily reflect, however, actual population reductions, because the sampling program that supported the estimates did not sample the entire population and for that reason overestimated the fraction of the population subject to entrainment. This point was well recognized by the authors of the article.<FN 5>

Furthermore, the estimates provided in the article make no adjustments for density-dependent factors for any of the six species. Through density-dependent factors, such as increased fecundity and growth rate, many species naturally compensate for early life stage losses. Thus, estimated population reductions based on conditional mortality rates generally are overestimations, unless some correction is made for density-dependent factors.

Finally, there is broad consensus among fishery managers that aquatic population impact assessments should be conducted at the adult level, not at the early life or juvenile stages. Thus, many of the impact assessment methodologies use "equivalent adult" calculations to interpret losses to the population at early life or juvenile stages. "Year-class strength" reductions measured entirely at entrainable life stages (typically days or weeks old) do not accurately predict declines in population size. Therefore, for all of the above reasons, the cited article does not, in and of itself, support EPA's contention regarding population declines or AEI. See also Comments, Part VII.A.

Footnotes

4 Boreman and Goodyear 1988 (DCN:1-5004-PR).

5 The article states: "The entrainment mortality estimates for bay anchovy and Atlantic tomcod probably do not reflect rates for the entire river populations of these species. Longitudinal distribution data collected in 1975 and 1976 revealed that the vulnerable life stages of these species were concentrated in the two lowermost sampling regions, suggesting that undefined

fractions of the populations were below river km 22 (Yonkers region)." Boreman and Goodyear 1988 (DCN:1-5004-PR).

EPA Response

EPA disagrees with a number of the assertions put forth by the commenters. The commenters are proposing that population impacts constitute the only appropriate means of evaluating adverse environmental impact. EPA believes that adverse environmental impact includes: impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries, and stress to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function. Due to the speed and certainty associated with using impingement and entrainment as a metric for measuring performance at new facilities, EPA rejects the idea that only population impacts are a valid metric of adverse environmental impact.

The commenters also fail to define the boundary of the population. It is not clear if they are referring to the population in the vicinity of the plant intakes, within some portion of the Hudson River, or a larger area. The commenters also assert that the Hudson River estimates do not necessarily reflect actual population reductions because the entire population was not sampled and therefore the study overestimated the fraction of the population subject to entrainment. EPA notes that judgments about impacts to a population depend on the boundaries of the reference population. The empirical transport model is used to estimate the impact to the population of new recruits, not the impact to the entire population. The Hudson River estimates indicate that these impacts are significant for Hudson river fishes. Furthermore, EPA disagrees with the commenter that potential density dependent compensation must be considered to estimate population impacts. EPA notes that the empirical transport model is a density-independent model by design because the prominent fisheries biologists who developed the model recognized the substantial uncertainties involved in estimating the functional form and magnitude of any potential compensatory process. This model formed the basis of the Hudson River settlement precisely because it was based on empirical data and not uncertain and vigorously debated hypotheses about compensation.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.406

Author Name	Terry M. Hogan & David E. Bailey
Organization	Utility Water Act Group c/o Hunton & Williams

Subject Matter Code 9.3

Documentation of I & E Impacts

Brayton Point

EPA also makes inaccurate statements about U.S. Gen New England, Inc.'s Brayton Point Generating Station, situated on Mt. Hope Bay in Somerset, Massachusetts. EPA asserts that "[s]tudies designed to evaluate whether the CWIS was affecting fish species abundance trends found that Mt. Hope Bay experienced a progressively steady rate of decline in finfish species of recreational, commercial and ecological importance." 65 Fed. Reg. 49,073 col. 2 (citing Gibson and New England Power Company and Marine Research, Inc., Final Environmental Impact Report and Section 316(a) and 316(b) Demonstrations Made in Connection with the Proposed Conversion of Generating Unit No. 4 from Closed-Cycle Cooling to Once-Through Cooling (1981) (DCN:1-5009-PR)). <FN 6> Finally, EPA cites Brayton Point as an example of the potential benefits to be gained by lowering intake flows to a level commensurate with a closed-cycle recirculating cooling water system. 65 Fed. Reg. 49,104 col. 2.

EPA's assertions are inaccurate. The fourth generating unit at Brayton Point began operation in 1974 with a closed-loop, saltwater evaporative cooling system that was subsequently converted to the use of freshwater because of objectionable salt drift. In July 1984, the Unit was switched to once-through cooling when local communities were no longer able to supply the necessary freshwater.

The conversion to open-cycle cooling included installation of a state-of-the-art angled screen intake system, which underwent thorough agency § 316(b) review. The Unit 4 intake was designed for a cooling water approach velocity of 0.5 fps. The combination of low approach velocity and angled screen alignment provides a guide for fish entering the intake area. Most fish entering that area are guided into a fish bypass system, which returns them to the Bay at some distance from the intake. Those fish that are impinged on the screens are washed off with a low-pressure spray and directed into the fish bypass system. To minimize entrainment mortality, Unit 4 has the capability of piggybacking on top of the cooling system for Units 1-3 in the winter (i.e., a portion of the Units 1-3 cooling water discharge is used as the cooling water intake for Unit 4), thereby closing its intake during critical winter flounder spawning season.

EPA's principal basis for suggesting that Brayton Point may be causing adverse impact apparently is a report by the Rhode Island Division of Fish and Wildlife (RIDF&W), Comparison of Trends in Fish Assemblages of Mt. Hope Bay and Narragansett Bay in Relation to Operations of the New England Power Brayton Point Station, prepared by Dr. Mark Gibson of the RIDF&W. We believe that EPA has taken this report out of context. The RIDF&W Report performs a statistical analysis of three coastal trawl data sets, one from Mt. Hope Bay and two from Narragansett Bay. The analysis concludes that the aggregate resource abundance, as defined by trawl data, has declined substantially in Mt. Hope Bay while remaining stable in adjacent Narragansett Bay. Gibson 1995 (DCN:1-5009-PR), p. 19.

The RIDF&W Report is not conclusive. It does not attempt to demonstrate linkage of fish population declines in Mt. Hope Bay with open-cycle operation of Unit 4 but merely finds a strong "correlation" and suggests that Brayton Point causality is the most viable hypothesis until disproved. The RIDF&W has concluded that commercial and recreational fishing pressure on winter flounder stocks has been above sustainable levels for a number of years (Lord 1998).

Dr. Gibson himself was careful to say that "[l]acking an experimental approach, it is not possible to demonstrate linkage with [Brayton Point Power Plant]" (RIDF&W Report, p. 11), much less that any of the trends observed in Mt. Hope Bay were attributable to entrainment or impingement at the facility. Indeed, while the RIDF&W Report speculates that reductions in finfish abundance may be attributable to elevated temperatures and/or reduced oxygen levels (p. 11), an analysis performed by Lawler, Matusky, and Skelly Engineers shows that the downward abundance trend also correlates with a substantial increase in fishing pressure. (See Figures 4 and 5 of the November 27, 1996 letter from A.H. Aitken, New England Power, to W. L. Bridges, Massachusetts Division of Marine Fisheries.)

Although there may well be substantial differences in the two Bays in terms of total resource abundance, individual species data present a different picture. Important species, such as tautog, windowpane, and winter flounder, which historically have dominated the Mt. Hope Bay trawl data, have experienced similar declines regionally. From this more focused view of the underlying data it is clear that declines in these species do not correlate well with the Unit 4 open-cycle operation. The apparently stable aggregate abundance in Narragansett Bay may be attributable to large population increases in other species, such as squid, which have never been found in abundance in Mt. Hope Bay.

Differences in measurements of key species populations also may be attributable in part to differences in sampling methodologies. Beginning in 1996, the Mt. Hope Bay standard trawl program was modified to make it consistent with the RIDF&W program so that the data would be more comparable.

Results of the sampling with the modified trawl program (Wilcox trawl) suggest trends in aggregated resource abundance different from those observed with the standard trawl. The data collected with the Wilcox trawl show higher numbers caught per tow than in the standard trawl because the finer mesh retains more of the smaller, more abundant pelagic species like bay anchovy. In addition, the Wilcox trawl results show a small increasing trend during the 1996 through 1999 time series, while the standard trawl catches are declining during the same period. While neither of these trends is statistically significant, they suggest that the conclusions in the RIDF&W Report regarding relative stability of the aggregated resource abundance in Narragansett and Mt. Hope Bays may have been biased by the fact that the trends from gears with different size cod end meshes were compared. For1996 through 1999, when comparable sampling methods were used in the Wilcox trawl, the trawl efforts for winter flounder in Mt. Hope and Narragansett Bays produced similar yields.

Estimates of winter flounder entrainment can be found in the Brayton Point 1998 Annual Biological and Hydrological Report issued by EPA on December 17, 1999. This annual report identifies the number of winter flounder larvae entrained in 1994 as 0.09 billion and estimates the adult equivalent mortality of winter flounder from entrainment losses at 3,467 pounds (unstaged) and 18,382 (staged), a small fraction of the average 96,507 pounds per year calculated with the entire time series data. During the relevant period in 1994, Unit No. 4 operated in the piggyback mode so that no entrainment

from that unit occurred. Furthermore, these values probably overstate the actual impact, because they assume 100% mortality of entrained organisms. Recent studies at Brayton Point Station show that some species survive passage through the cooling system in significant numbers. Winter flounder, windowpane, and Atlantic silverside survival, for example, were 90%, 65%, and 95% during the 1997-1998 entrainment study.

For these reasons it is inappropriate to rely on any "conclusions" about Brayton Point Station and Mt. Hope Bay to show that the Station is having a serious impact. The RIDF&W Report does present an important hypothesis that deserves serious inquiry, and in response to a § 308 data request from EPA Region 1, U.S. Gen New England, Inc. currently has underway a comprehensive study to clarify the impact of the Brayton Point Station on the ecology of Mt. Hope Bay. This includes site-specific thermal plume modeling, critical temperature analysis for representative and important species, fish population modeling, and intake technology review. Until this extensive study program is complete, the only fair conclusion is that more site-specific study is required before any conclusions can be drawn about whether the Brayton Point Unit No. 4 has caused or is likely to cause adverse environmental impact in Mt. Hope Bay.

Footnotes

6 The preamble to the proposed rule also states:

The modification of Unit 4 [which resulted in a 45% increase in cooling water intake flow] is estimated to have resulted in an 87% reduction in finfish abundance based on a time series-intervention model. These impacts were associated with both impingement and entrainment, as well as the thermal discharge of cooling water. Data indicate that annual entrainment at Brayton Point averages 4.9 billion tautog eggs, 0.86 billion windowpane eggs, and 0.89 billion winter flounder larvae each year. Using adult equivalent analyses, the entrainment and impingement of fish eggs and larvae in 1994 translated to a loss of 30,885, 20,146, and 96,507 pounds of adult tautog, windowpane, and winter flounder, respectively.

65 Fed. Reg. 49,073 col. 2 (also citing Gibson study).

EPA Response

The Agency disagrees with the commenters that EPA has made inaccurate statements regarding the Brayton Point facility.

EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. Also, the Agency has used the best data available in developing today's rule. EPA agrees with fisheries experts and resource managers that there is unavoidable uncertainty associated with managing fish populations and notes that NMFS, despite the availability of state-of-the-art fish population models and considerable experience managing fisheries has classified 34 percent of their managed fishery stocks as over-utilized. The Agency continues to maintain that the winter flounder in Mt. Hope Bay are subject to substantial entrainment at the Brayton Point facility, and the population has experienced a dramatic decline over the past 15 years. Even though fishing restrictions have been imposed, the population has failed to recover. Given the documented decline in many fishery stocks and the admitted uncertainty associated with managing fish populations, EPA believes that a precautionary approach is warranted. This is especially appropriate in that the Agency has extensive data documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes.

EPA also disagrees with the commenters implication that commercial fishing pressure is the primary causative agent in the decline of winter flounder. The Rhode Island Division of Fish and Game report does not "merely" find a strong correlation between fish population declines and the operation of Unit 4 in open cycle mode, rather it "finds" a strong correlation between the two phenomena. The commenter appears to mistakenly assume that EPA believes that the Brayton Point facility is the sole cause for the decline of winter flounder in Mt. Hope Bay. Rather, EPA recognizes that there are multiple stressors and factors likely responsible for this phenomenon and further recognizes that increased fishing pressure may be one of the contributing factors along with cooling water intakes.

Please see Response to Comments 316bNFR.038.01, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble for additional discussion of these issues.

Comment ID 316bNFR.068.407

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Subject Matter Code 9.3

Documentation of I & E Impacts

Salem Generating Station

EPA uses the addition of modified screens and improved fish return baskets added to the CWIS at the Salem Generating Station as an example to indicate the benefits of technologies that can be applied to maximize survival. 65 Fed. Reg. 49,105. The Salem example is an appropriate example of application of CWIS modifications found to be BTA through a site-specific determination under §316(b). These modifications, as EPA indicated, did result in substantial improvements in impingement survival rates; however, the specific benefit estimates cannot be verified. EPA's benefit assessment for the Salem Generating Station is based upon undocumented estimates and methodologies and thus does not provide a reliable basis for assessing the likely benefits of the proposed §316(b) regulations for new sources. EPA reports estimates of the benefits of Salem's modified screens and improved fish return baskets that reduce impingement stress and increase survival of impinged fish. 65 Fed. Reg. 49,105. The EPA annual benefit estimates are $269,000 for recreational benefits, $25,000 in commercial benefits, and $134,500 in non-user benefits. Id. See also EEA, pp. 11-23 – 11-24.

The only documented source for any of EPA's values is Ronafalvy et al. 1999. This study used data for a two-month period in 1995 to assess the effectiveness of the modifications. The study compared fish survivability after the first of the two Salem units were modified with the alternative technologies. EPA reports the study's conclusion that the modified units "are likely responsible for a 51% reduction in overall weakfish losses . . ." 65 Fed. Reg. 49,105. EPA then proceeds to develop overall benefit estimates in terms of annual recreational and commercial landings of all species, and dollar values for recreational, commercial and non-use categories.

None of the calculations used to translate the Ronafalvy et al. estimates of improved impingement mortality into benefit estimates is documented, much less referenced. Furthermore, the values were not produced for the Salem Generating Station New Jersey Pollutant Discharge Elimination System (NJPDES) Program Permit renewal application, since no cost-benefit analysis was performed for the technologies already installed at the Station. PSE&G had provided EPA with portions of this application, including the section which describes the modifications to the CWIS and the biological benefits associated with the intake screen system. See letter from John H. Balletto to Deborah Nagle dated September 1, 1999, which included Appendix G, "PSE&G's Compliance With The Special Conditions Of The 1994 Permit Is Providing And Will Provide Substantial Benefits." Appendix G contains a summary of the impingement survival analysis that compared impingement survival rates from 1978-1982 to impingement survival rates in 1997-1998. This analysis demonstrated increases in impingement survival rates ranging from 23% for bay anchovy to 69% for Atlantic croaker.

If EPA were to do an appropriate estimation of the benefits associated with the improved screen system, the following information would have to be developed:

* Estimates of the annual baseline weakfish levels (i.e., levels without the modifications);

* Estimates of the annual gains due to the revised technologies;
* Estimates of annual baseline levels for other fish;
* Estimates of the annual gains for other fish due to the modified screen technology;
* Estimates of the commercial values for weakfish and other fish;
* Estimates of the recreational values for weakfish and other fish; and
* Estimates of the non-use values for weakfish and other fish.

None of these values are presented in the EEA. Indeed, the Ronafalvy et al. study only provides estimates of improved impingement survival rates for weakfish and does not estimate the amount of fish protected by the modified screens. The extrapolation of weakfish results to other species may be problematic because it fails to take into account the inter-species variation in CWIS effectiveness. <FN 7> Ronafalvy, et al. find that the survival rate of larger weakfish increased more than smaller weakfish due to the screen modification, suggesting that a simplistic application of the weakfish results to other species may not be appropriate, given the availability of species-specific data.

In sum, the benefit estimates presented for Salem in the EEA lack both documentation and foundation. They are not appropriate as a basis for estimating the benefits of screen and other modifications at Salem, and certainly are not acceptable as indications of the likely benefits of the proposed §316(b) regulations for new facilities.

Footnotes

7 However, this is not the case at Salem. PSE&G has actual data that document the improved impingement survival for other species involved at the intake.

EPA Response

The commenter objects to EPA's estimates of the economic benefits of a technology installed at the Salem facility to reduce impingement losses. This information was included in Chapter 11 of the Engineering and Economic Analysis for the proposed New Facility Rule to indicate the potential benefits of technologies designed to reduce impingement. Rather than debate the details of the analysis, EPA has chosen to delete this information and has revised this section of Chapter 11 to include benefits estimates by the facility. According to PSEG's 1999 Permit Renewal Application (Appendix F, section IX, Table 12), use of dual-flow, fine mesh traveling screens at the Salem facility to achieve an approach velocity of 0.5 fps would have a total economic benefit of $3.64 million in 2000 dollars.

Comment ID 316bNFR.068.408

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Subject Matter Code 9.3

Documentation of I & E Impacts

St. Lucie

EPA asserts that "EPA is aware that over a 9-year period more than 1,300 endangered sea turtles entered enclosed cooling water intake structure canals at one power plant." 65 Fed. Reg.49,072 col. 3. The accompanying footnote adds that "[t]he plant developed a capture-and-releaseprogram in response to these events. Most entrapped turtles were captured and released alive; however, some mortality has occurred." Id. n. 9.

Although EPA does not identify the facility it is referring to, it appears that it may be describing Florida Power & Light's (FPL's) St. Lucie Nuclear Plant. It is difficult to say whether the number 1,300 over nine years is accurate, because EPA does not disclose which nine-year period it reviewed. In any case, FPL maintains a program by which biologists remove turtles found in the intake canal and measure, weigh, and tag them before releasing them back to the ocean. The program has compiled one of the oldest and most comprehensive databases on sea turtles in Florida. The database has been cited on various occasions in scientific literature associated with sea turtles.

In 1976-1998, 6,581 sea turtles entered the St. Lucie intake canal. Most of them (3,880) were loggerhead turtles, which are threatened but not endangered. In the same time period, 2,622 green sea turtles and 79 leatherbacks, hawksbills, or Kemp's Ridleys (all endangered) also entered the canal. Of these 6,581 turtles, only 197 (3 percent) were found dead or subsequently died. FPL has an incidental take permit from NMFS to accommodate these mortalities. See Ecological Associates, Inc., Physical and Ecological Factors Influencing Sea Turtle Entrainment Levels at the St. Lucie Nuclear Plant: 1976-1998. (March 2000). St. Lucie Plant's handling of sea turtles is also subject to environmental and notification requirements in operating licenses administered by the Nuclear Regulatory Commission.

Beach nesting surveys conducted by FPL on Hutchinson Island, Florida, on which the plant is located, indicate that the adult sea turtle populations appear to be on the increase in the area. The 2000 nesting season resulted in a record number of loggerhead and green sea turtle nests. Leatherback nesting, although still rare, is also generally increasing.

EPA Response

The Agency believes that it used the best information available for the proposed and final rule. Historical studies like those documented at St. Lucie provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. EPA acknowledges that historical data from selected facilities may not reflect current impingement and entrainment rates at certain facilities, particularly if technologies and other operational measures for reducing impingement and entrainment rates at the facility have been implemented since the original study. Nevertheless, EPA asserts that the examples of environmental impact provided in the proposed rule are illustrative

of the types of effects associated with cooling water intake structures.

Further, stresses on populations and communities related to cooling water intakes may not manifest immediately. Impingement and entrainment of forage fish, other food sources, and/or diminishment of ecosystem health or complexity related to the impact of cooling water intakes could contribute to stress on an ecosystem. EPA believes that it is essential to take a precautionary approach toward protecting aquatic resources and especially so with threatened and endangered species.

As EPA has stated in the Response to Comments and in the preamble to today's rule, EPA provided a number of examples of impingement and entrainment associated with existing facilities. It is important to note that these examples were not meant to predict effects at new facilities but rather to illustrate that the number of organisms impinged and entrained by a facility can be substantial and can include threatened and endangered species.

Comment ID 316bNFR.068.409

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Subject Matter Code 9.3

Documentation of I & E Impacts

Contra Costa and Pittsburg Stations

EPA contends that the Contra Costa and Pittsburg Stations "impinge and entrain threatened delta smelt and endangered runs of chinook salmon and steelhead trout." 65 Fed. Reg. 49,072 n. 10. This single statement, taken out of context, is misleading.

Several impingement and entrainment sampling and monitoring studies have been conducted at the Pittsburg and Contra Costa Generating Stations. These studies (EA 1981a, EA 1981b) and several striped bass monitoring studies submitted to the Regional Water Quality Control Board) document that, delta smelt, chinook salmon, and steelhead trout are sometimes found in the vicinity of the intakes. For example, one study was conducted during a six-month period from 1978 to 1979 as part of a § 316(b) demonstration program; another was conducted for a three-month period (May 1 to mid-July) each year from 1986 to 1992 as part of a striped bass monitoring program.

These studies, in the interest of ensuring adequate protection of the environment, incorporated many conservative assumptions. For example, in many cases the studies (1) did not distinguish between larval delta smelt and larval non-endangered longfin smelt, thereby overestimating the potential effects on delta smelt; (2) did not take into account the high natural mortality rate of larval delta smelt; and (3) demonstrated that the abundance of aquatic species in the cooling water samples varied substantially, resulting in large confidence intervals in estimating the occurrence of organisms in the cooling water flows of the plants. Therefore, the studies do not demonstrate a clear impact on any threatened or endangered species that is attributable to the operations of the Contra Costa and Pittsburg Generating Stations.

EPA does not mention in its initial discussion of potential impacts due to the facilities (65 Fed. Reg. 49,072) the significant voluntary efforts of the facilities to reduce the impacts. EPA does, however, acknowledge these efforts later in the preamble:

Two plants in the San Francisco Bay/Delta, Pittsburg and Contra Costa in California, have made changes to their intake operations to reduce impingement and entrainment of striped bass (Morone saxatilis). These operational changes have also reduced incidental take of several threatened and endangered fish species, including the delta smelt (Hypomesus transpacificus) and several runs of chinook salmon (Oncorhynchus tshawytscha) and steelhead trout (Oncorhynchus mykiss). According to technical reports by the facilities, operational BTA reduced striped bass losses by 78 percent to 94 percent, representing an increase in striped bass recreational landings of about 15,000 fish each year.

65 Fed. Reg. 49,104.

But even this discussion overlooks additional voluntary efforts at both facilities. Southern Energy Delta LLC, the current owner, is developing a habitat conservation plan in consultation with resource

management agencies and is seeking approval to deploy and evaluate a new aquatic filter barrier (AFB) that would be suspended in the water column and extend from the water's surface to the substrate.

The AFB is designed to exclude larval and juvenile fishes from entrainment in the cooling water intake structures of power plants. An AFB has been used successfully to reduce the entrainment and impingement of fish on the Hudson River. If the AFB performs as anticipated in the Sacramento-San Joaquin delta, it may reduce entrainment of larval and juvenile aquatic species by 80 to 90 percent. The AFB is also anticipated to reduce impingement of larval fishes.

In short, EPA's proposed § 316(b) rule suggests that the Contra Costa and Pittsburg plants are causing impacts to threatened and endangered species, even though any such impacts have not been definitively established, and without considering current efforts to reduce or eliminate any impact that might be occurring.

EPA Response

The Agency believes that it used the best information available for the proposed and final rule. Historical studies like those documented at Contra Costa and Pittsburg provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. EPA acknowledges that past data from selected facilities may not reflect current impingement and entrainment rates at certain facilities, particularly if technologies and other operational measures for reducing impingement and entrainment rates at the facility have been implemented since the original study. EPA supports the use of new and innovative technologies which can substantially reduce impingement and entrainment rates including the use of aquatic filter barriers. Nevertheless, EPA asserts that the examples of environmental impact provided in the proposed rule are illustrative of the types of effects associated with cooling water intake structures.

EPA disagrees with the commenters position that there is no attributable impact on threatened or endangered species from the operations of the Contra Costa and Pittsburg plants. The demand to demonstrate absolute certainty about the causal relationship between a stressor and the impact on the system is unrealistic given the complexity of aquatic systems. As recently expressed by a NMFS advisory panel "uncertainty and indeterminancy are fundamental characteristics of the dynamics of complex systems. Predicting the behaviors of these systems cannot be done with absolute certainty, regardless of the scientific effort invested." EPA agrees with the conclusion of the NMFS panel that "[G]iven the high variability associated with ecosystems, managers should be cognizant of the high likelihood for unanticipated outcomes. Management should acknowledge and account for this uncertainty by developing risk-averse management strategies that are flexible and adaptive." Additionally, EPA analyses suggest that more than 99 percent of surveyed existing cooling water withdrawal facilities are located within 2 miles of waters that are identified as impaired and listed by a State of Tribe as needing development of a total maximum daily load (TMDL). This suggests that cooling water intakes may be a contributing factor to existing stresses on water bodies and resident biota.

Moreover, stresses on populations and communities related to cooling water intakes may not manifest

immediately. Impingement and entrainment of forage fish, other food sources, and/or diminishment of ecosystem health or complexity related to the impact of cooling water intakes could contribute to stress on an ecosystem including threatened and endangered species. EPA believes that it is essential to take a precautionary approach toward protecting aquatic resources and especially so with threatened and endangered species. EPA is also concerned that extensive data sets, encompassing 20 or more years of data, may be required to adequately assess whether or not populations are being affected by intakes. Under such circumstances a precautionary approach is warranted.

Please see Response to Comment 316bNFR.068.408.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.410

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Subject Matter Code 9.3

Documentation of I & E Impacts

Crystal River

Florida Power Corporation's (FPC) Crystal River Power Plant, located in Crystal River,Florida, consists of five units. Four of these units (CR-1, 2, 4 and 5) are coal-fired and the fifth (CR-3) is nuclear. Units 1, 2, and 3 are collectively known as CR South and have a separate NPDES Permit.

In a 1979 NPDES Permit renewal, EPA asserted that these three units had caused adverse environmental impacts due to entrainment and impingement. FPC contested this assertion and later conducted impingement and entrainment mortality studies in 1984, which appeared to support a finding of no significant adverse impact. However, EPA interpreted the data differently and, in the 1987 renewal of the permit, reasserted its previous determination of adverse environmental impact. EPA's Supporting Statement cited an EPA Region 4 report stating that "specific losses" at Crystal River included 23 tons of fish and shellfish annually.

FPC believed that this information was taken out of context and misapplied by EPA. First, the numbers EPA cited were extremely conservative, because they were derived from the total entrainment estimates in the 1985 study, without applying any mortality statistics. A subsequent entrainment mortality study at Crystal River showed a high survival rate for representative indicator species.Second, the estimates were never correlated with trend data for total commercial take as a basis for determining significance. Third, there was no consideration of the fact that the local ecosystem supports a healthy and balanced indigenous population of marine life. This fact alone provided direct evidence that the plant was not causing significant adverse environmental impact.

Despite the lack of evidence of adverse environmental impact, in ensuing negotiations FPC agreed to a settlement with EPA. The settlement called for the implementation of an Environmental Enhancement Program (EEP), which included the installation of bar racks and traveling screens, flow minimization practices, and the construction of a mariculture center. The mariculture center is particularly effective, having produced and released 742,000 red drum, 378,000 sea trout, and 56,000 white shrimp.

In summary, EPA has no sound basis for citing the Crystal River Power Plant as evidence of AEI due to entrainment and impingement. The settlement reached between FPC and EPA was simply an expedient method of resolving permit negotiations and not a concession that AEI has, in fact, occurred. Crystal River's mitigative actions subsequent to its settlement with EPA are highly relevant to any discussion of the facility's potential to cause environmental impact.

EPA Response

EPA disagrees with the commenters that the information on the Crystal River facility was taken out of

context. While EPA has acknowledged that entrainment mortality can be highly variable and subject to numerous factors, EPA has documentation that entrainment mortality can be as high as 100 percent for selected species and life stages. Also, EPA has never stated that cooling water intakes are the sole cause of impaired aquatic resources, rather, it is the Agency's position that there are many stresses adversely impacting the aquatic environment and cooling water intakes are one that cause significant mortality.

EPA also disagrees with the commenters statement, and its implication, that there was no consideration that the ecosystem in the Crystal River area supports a balanced indigenous population of marine life. This is an apparent reference to the protective standard under section 316(a). EPA has long maintained that the standards applicable under section 316(a) and (b) are different and that a facility can satisfy the 316(a) standard without meeting the requirement of 316(b) to minimize adverse environmental impact. See the preamble to the final rule and 316bNFR.068.008.

Further, EPA rejects the commenters implication that adverse environmental impact is one single thing. EPA asserts that adverse environmental impact includes: impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries, and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function.

Finally, EPA has provided extensive documentation that substantial numbers of organisms are impinged and entrained by cooling water intakes and has stated elsewhere that the existing and historical studies provide only a partial picture of the severity of environmental impact associated with cooling water intake structures.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.068.500

Subject Matter Code DELETE

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EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

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On Behalf Of:

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316bNFR.069

Comment ID 316bNFR.069.001

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name C. Richard Bozek

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Section 316(b) of the Clean Water Act requires that

any standard established pursuant to section 301 or section 306 of this Act and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

EPA has proposed Clean Water Act ("CWA") 316(b) rules for new cooling water intake structures (CWIS) that would impose uniform, minimum technology requirements along with extensive site-specific study and monitoring requirements aimed at allowing permit writers to assess the need to impose even more stringent requirements in particular cases. The proposed rule contains many shortcomings that need to be addressed before it can be shown that it will satisfactorily meet the objectives 316(b) as written. In a broad sense the shortcomings can be summarized as:

1. not properly accounting for or optimizing the factors affecting impingement and entrainment of aquatic organisms. The use of artificially created "categories" based on waterbody type, intake location and amount of water withdrawn from a waterbody simply do not accurately "model" what 25 years of empirical evidence and scientific study illustrate about the site specific nature of this issue.
2. the process for selecting Best Technology Available ("BTA") has been essentially reduced to a single acceptable technological choice and which again conflicts with the science of the issue and the cost test imposed by the statute to make optimal choices between technology and environmental objectives; and
3. the proposed cost test in not in keeping with the 316(b) precedent and will not lead to optimal decision;
4. the overarching requirement to properly assess the scope of effect of any proposed regulatory action and its cost.

This proposed Agency action maximizes the costs of implementing section 316(b) by requiring technologies that may be more stringent than necessary at a given site while in essence avoiding grappling with the critical question of whether the environment is served. It also does very little to reduce the transactions costs associated with the standard. It is, unfortunately, the worst of all outcomes.

This proposed regulation comes at a time in the electric utility sector when new facility planning and construction schedules are necessarily compressed (2-3 years in many cases), competition is fierce and the industry is struggling with concerns over energy supply consequences. All of these realities stem from the need to bring power on-line to fuel the growing U.S. need for electricity.

EPA Response

EPA believes that the two-track technology-based option selected for the final rule addresses the

issues the commenter raises about the proposed approach. The two-track approach does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

EPA has determined that the two-track approach is economically practicable for the industries affected by the rule. EPA believes it has set requirements based on available technology and economic practicality.

See response to comment 316bNFR 053.001 which addresses the commenter's issue regarding the appropriateness of the cost test approach used in this rulemaking.

BTA requirements were considered in the context of cost for the technology relative to the environmental benefit. See Section VIII of today's rule for a summary of BTA cost estimates and the Economic Analysis and Technical Development Document which support this rulemaking. EPA believes this approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing new facilities.

Comment ID 316bNFR.069.002

Subject Matter Code OPP

General Statement of Opposition

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

In these comments, we demonstrate that the EPA's proposed rule is based on faulty technical and economic assumptions. The net result of relying on this information is a rule that does meet the prescribed environmental goal of the stature or the administrative goal or consistent application expressed by EPA.

Only an alternative that preserves the flexibility to develop individual requirements based on site-specific characteristics will result in a rule that is capable of maximizing the net benefits to society and accomplish environmental objectives.

Throughout the information gathering phase of this rulemaking, and in EEI's comments (and those of UWAG) industry has convincingly shown why a viable site-specific alternative to EPA's universal national standard is desirable and possible. Our years of experience have shown that the selection of the best location, design, construction and capacity of a cooling water intake structure is highly site-specific. The regulatory framework established by the agency must take into account these variations or it will lead to an overly costly or under protective outcome. Moreover, a uniform technological standard will stifle innovation, may not be consistent with environmental protection objectives and will result in undesirable energy supply consequences. We support a program that minimizes the cost of implementing the program, while preserving the flexibility and efficiency of the site-specific approach.

EPA Response

EPA appreciates the concerns of the commenter and has incorporated a two track compliance approach into the final rule to address the issue of site specific differences. Facilities that believe their site specific characteristics allow them to comply with the rule using technology other than that identified in the technology option selected may choose to conduct a study to demonstrate that they can comply with the standard using different that reduces impingement mortality and entrainment to the same extent. See the preamble to the final rule for a complete discussion of two track approach adopted by EPA and for a discussion as to why EPA did not accept the industry two track approach for new facilities..

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Comment ID 316bNFR.069.003

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

EEI encourages EPA to select and modify one of the "alternative" proposals EPA has offered in its proposal. In one alternative, EPA suggests setting up a "rebuttable presumption," which the permittee could overcome by site-specific studies. As proposed the "rebuttable presumption" alternative is not acceptable for several reasons. A "rebuttable presumption" suggests that the simple-but-conservative choice is one that has been proved to be right for most situations. It suggests that simply complying with the rule is preferred over a careful review of the particular characteristics of the site in question. It can be shown that a site-specific decisionmaking process is more scientifically sound and produce finer-tuned decisions. With a presumption, applicants are encouraged to accept the presumption and regulators may come to regard any other approaches as undesirable, regardless of environmental outcomes.

EPA Response

See responses to comments 316bNFR.009.004 and 316bNFR.068.001.

Comment ID 316bNFR.069.004

Author Name C. Richard Bozek

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Subject Matter Code 1.2

Consent Decree

EPA last attempted to establish 316(b) rules in the 1973. Industry challenged EPA's rules on procedural grounds. In 1977, The United States Court of Appeals for the Fourth Circuit suspended the rules, holding that neither the rules nor the Development Document to which the rules referred could legally be applied to any point source until EPA had cured the procedural defect. Appalachian Power Co. v. Train, 566 F.2d 451, 457 (4th Cir. 1977). EPA took no steps to cure the procedural defect and since that time, NPDES permit writers have applied 316(b) on a case-by-case basis. For more than 20 years a substantial body of guidance, administrative precedent and case law have shaped implementation of 316(b).

In 1993, EPA announced its plan to develop new 316(b) rules, in part due to a citizen suit filed by the Hudson Riverkeeper (Cronin v. Browner, No. 93 Civ. 0314 (AGS) (S.D.N.Y.)). To settle that lawsuit, EPA ultimately signed a court-approved consent decree.

EPA contacted various industry segments potentially affected by this rulemaking and opened dialogue with those stakeholders seeking to expand its knowledge of the issues. The utility industry responded by engaging in meetings with the Agency to discuss issues of concern, conducting power plant tours so that Agency personnel and contractors could learn first-hand the issues and solutions, and providing written documents that critiqued and commented of some of the initial background work performed by the Agency.

In 1998 EPA earnestly began to develop and request input on a massive questionnaire that was intended to obtain engineering, biological and economic data from key affected parties in the rulemaking, including the steam electric power industry. How that information was to be incorporated into a meaningful database and analyzed to make informed decisions about the critical issues affecting 316(b) decisions was never completely understood by most of the interested parties. OMB disapproved EPA's ICR concerning the questionnaire, indicating that EPA had not adequately demonstrated the practical utility of the information it planned to request. Nevertheless, EPA refined its information collection tools and eventually sent a questionnaire to a large portion of the steam electric utility industry. Similar questionnaires went to other industry segments. It remains unclear how this information was incorporated into a meaningful database with which to conduct a regulatory analysis. Moreover, despite this information collection, EPA continues to seek information through other avenues in order to collect better site-specific information concerning 316(b) issues and decisions.

In June 1998 EPA released a pre-decisional "regulatory framework." That framework consisted of two flow diagrams B one for entrainment and one for impingement. EPA held a June 1998 public meeting to discuss (1) the regulatory framework for the rulemaking, (2) environmental criteria to be considered in defining and assessing AEI, and (3) plant characteristics that contribute to AEI. Electric utility industry groups included EEI, UWAG, EPRI, American Public Power Association and the Large Public Power Council and the National Rural Electric Cooperative Association. Other industries also participated, including the Chemical Manufacturers Association, American Forest &

Paper Association, and the American Petroleum Institute. Environmental groups included the NRDC, Hudson Riverkeeper, Delaware Riverkeeper, and Scenic Hudson. State agencies in attendance included the New York State Department of Environmental Conservation and the Pennsylvania Fish Commission.

The electric utility industry stated that a site-specific approach for determining compliance with the statute is required due to the complex interaction of biological, environmental, and engineering factors inherent in 316(b) decisions. In addition the industry advocated that a tiered decision framework utilizing existing data and progressing to site-specific studies, if necessary is a reasonable and effective way to implement 316(b). We were cautiously optimistic that certain elements of the Agency's pre-decisional framework acknowledged the need for flexible site-specific decisionmaking.

In its July 10, 1998 Quarterly Report in Cronin v. Browner, EPA acknowledged, for the first time, that it might be unable to meet the court-ordered July 2, 1999 deadline for proposal of the 316(b) regulations.

EPA announced a second 316(b) public meeting for September 1998. The topics for discussion at that meeting were: (1) approaches to identifying and selecting BTA; (2) treatment of costs and benefits (e.g., the relationship between costs of candidate intake technologies and their operation and the estimated environmental benefits to be gained from deployment of the technologies); and (3) the role of non-CWIS mitigation (e.g., installation of fish ladders or wetlands restoration) in the ' 316(b) process.

At the September meeting, many of the same industry representatives presented views espousing the need for site specific decisions if the relationships between costs and benefits were to be accurately assessed and properly balanced. In the same month, EPRI held a technical workshop for EPRI members and EPA staff. At EPA's request, a representative of the Hudson Riverkeeper also was invited to attend. The workshop focused on issues relating to the definition and assessment of AEI under 316(b). The workshop included case studies presented by nine electric utilities with CWISs located on a variety of different types of waterbodies. Experts from EA Engineering Science and Technology, Oak Ridge National Laboratory, Applied Biomathematics, and TVA presented papers on a range of issues concerning methods and models for assessing AEI. A final session explored issues relating to the application of various methods and models, including the appropriateness of using operating or other thresholds to determine the potential for AEI, and uncertainties surrounding methods of accounting for compensation in aquatic populations.

At two additional but separate technical conferences held later 1998 and early 1999, representatives of EPA presented papers describing the Agency's current thinking regarding elements of the forthcoming proposed action. Inexplicably, the Agency's thinking had strayed in a negative direction from many of the elements contained in the pre-decisional regulatory framework vetted at the two 1998 public meetings.

It was clear in the April 12, 1999 Quarterly Status Report to the Court in the Cronin case, that EPA could not meet the deadlines established by the Consent Decree. By the summer of 1999, EPA was locked in negotiations with John Cronin, et al., over the length of any extension to the 316(b) rulemaking schedule specified under the Consent Agreement, meeting several times with the plaintiffs.

On August 2, 1999, EPA filed a Motion requesting an extension of time to issue regulations implementing 316(b) of the Clean Water Act. Specifically, EPA requested the court's permission to bifurcate the rule into two phases. Phase I would set requirements for new facilities using cooling water intake structures, and Phase II would address existing facilities. EPA proposed in its Motion to release the Phase I proposed rule on October 5, 2000, and to finalize it by May 16, 2002, and to release the Phase II rule proposal on May 16, 2002, and finalize it by April 1, 2004.

In support of EPA's Motion, the Associate Administrator for Water, Chuck Fox, supplied a declaration that (1) described the nature of the regulation and its complexities, (2) detailed the progress the Agency has made on developing the regulation, and (3) discussed some of the anticipated advantages of bifurcating the rule. In doing so, the affidavit revealed much about EPA's thinking at the time. The framework originally presented at the 1998 public meetings had morphed from one that could have supported site-specific decisionmaking into a more restrictive and arbitrary one containing overly simplified assumptions. EPA also clarified that it would apply only to existing sources.

In September, industry filed a motion to intervene and respond to EPA's motion with supporting documents. We supported the need for EPA to have additional time to collect appropriate and establish a record supporting any proposed action for both new facilities and existing ones. We opposed the bifurcation of the rulemaking.

In February 2000, industry learned that Judge Schwartz apparently had an extremely negative reaction to EPA's proposal for an extension of time. Reportedly, the judge questioned whether the efforts EPA has taken to date were necessary, productive, and efficiently implemented. The judge indicated he was considering appointing a Special Master to undertake a factual investigation of the Agency's conduct to date and to recommend an appropriate schedule. The Special Master also might supervise further settlement negotiations between the parties. As to bifurcation, the judge reportedly indicated that he did not know whether bifurcating the rule was warranted or not, and wished to have the Special Master explore that issue as well.

At the hearing later in February Judge Schwartz voiced his concerns, focusing on EPA’s lack of strong reasons for failing to meet the original Consent Decree deadlines and the potential for additional delays in light of the Agency’s past conduct. In response, the Assistant United States Attorney indicated that EPA would be prepared to offer, within ten days, other alternative schedules that might involve less delay but also might require some sacrifice in “quality.”

On March 28, 2000, Judge Schwartz released his decision on EPA’s motion for an extension of the consent decree schedule in the Cronin case. In essence, he accepted EPA’s rationale regarding the need for bifurcation but rejected the specific deadlines EPA proposed. Instead, he set a July 20, 2000 deadline for proposing the new facility rule and a July 20, 2001 deadline for proposing the existing facility rule.

In early April, industry representatives met with EPA’s new management team for the 316(b) rulemaking. Industry learned that EPA was quite concerned about getting all of the questionnaire responses in as soon as possible because the Consent Decree (which imposes an August 13, 2001 default deadline for “taking final action” on both rules, subject to further negotiation between the

parties under the court's recent order) may not allow the Agency to consider fully and use information that it received after June 2000.

EPA noted that it did not intend to define "adverse environmental impact" ("AEI") in the proposed new facility rule. Agency management was not convinced the Agency needed to define the term. Industry again stressed why it believes the AEI determination plays an important role under 316(b) and why it is important that EPA provide permit writers with at least some guidance on the factors they may consider in arriving at a site-specific decision about whether AEI is occurring.

Later in April, at yet an additional meeting, industry representatives discussed with EPA the current technical projects being conducted. EPA staff were enthusiastic about receiving this information but expressed concern over the limited time they may have to adequately review this new information.

Finally, twice in May 2000, industry representatives again met with EPA to discuss the direction EPA planned to take in its proposed 316(b) rule for new facilities. Concerning the definition of AEI, we learned that EPA still did not intend to define AEI, but that it would have to link its performance standards to reduction of environmental impact in some fashion.

From what we had learned from EPA, that the proposal would contain:

EPA's approach to identifying "sensitive waters" was fairly arbitrary and was likely to be both over- and under-protective in a number of cases;

EPA's decision to include a velocity threshold is quite arbitrary from a biological point of view and could foreclose use of many worthwhile technologies (for instance, an innovative new diversion mechanism that uses high velocities to channel salmon fry away from areas where they might become impinged or entrained at hydroelectric facilities);

the definition of "new facility" to which this rule would apply needs to be carefully crafted so that it does not sweep in facilities in which significant contractual obligations or other construction-related efforts already have been undertaken; and

the performance standards based on recirculating cooling that EPA plans to impose are likely to have adverse environmental effects, such as significant efficiency losses, that need to be balanced against the benefits, if any, of reducing entrainment or impingement.

Much of this information is now presented as technical appendices to the industry's comments (see UWAG comment package). This information is new information that has been vetted among academicians and researchers in the engineering, biological, technical and economic aspects of 316(b) decisionmaking. It is new information not available to the Agency before now and deserves a complete review by the Agency prior to any final action.

Notwithstanding this process and repeated efforts by EEI, UWAG, and our industry to provide positive suggestion on ways for EPA to create a workable 316(b) framework, we are dismayed that the Agency's current proposal persists in applying a methodology and a set of requirements that are inappropriate, overly rigid, and unnecessarily costly. Once again, we encourage EPA to adopt an

alternative incorporating site-specific decisionmaking

EPA Response

To the extent that the commenter discusses the history of this rulemaking, EPA believes that the relevant history is set forth in the preambles to the proposed and final rules.

EPA has chosen not to adopt site specific decision making exclusively in this rule, but rather to based a fast track permitting approach on requirements based on technologies that are technically available, economically practicable, have acceptable non-water quality environmental impacts (including energy impacts) among other considerations. EPA has provided some flexibility for site-specific rulemaking for new facilities through Track 2 if the new facility can demonstrate a comparable reduction in impingement mortality and entrainment as can be achieved in Track 1. EPA has chosen to seek reduction in impingement mortality and entrainment as a more objective and quicker approach of best technology available for minimizing adverse environmental impact than a site specific population approach because the methods for measuring these endpoints are more concrete and objective and therefore can be dealt with in a relatively shorter time frame than properly conducted populations studies. Due to the variable nature of biological systems, population studies must be conducted over 1-3 years

With respect to the definition of new facility as it relates to contractual obligation, EPA has adopted the term generally used in Clean Water Act programs for commencement of construction under 40 C.F.R.§ 122.29(b)(4) in order to provide for consistency in NPDES permitting. 40 C.F.R.§ 122.29(b)(4)(ii) explains how contractual obligations relate to the determination of whether the facility has commenced construction and therefore is not a new facility.

EPA has considered the adverse environmental effects of wet cooling. See the preamble to the final rule, the Technical Development Document, and other comment responses for a detailed explanation of these effects.

Comment ID 316bNFR.069.005

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

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What Is The Appropriate Goal of a 316(b) Standard?

The policy principles of this administration as set forth in Executive Order No. 12866 establish the maximization of net benefits to society as the ideal for all regulatory programs. Section 1 of the Executive Order states that "in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits, ... unless a statute requires another regulatory approach." The Clean Water Act and section 316(b) do not require another regulatory approach excluding the maximization of net benefits. Section 316(b) requires that the EPA require the "best technology available" ("BTA") to minimize adverse environmental impact ("AEI"). It is commonly understood that a determination of BTA includes a consideration of economic factors, including cost. Consistent with the meaning of BTA and the regulatory policy set forth in Executive Order No. 12866, the best technology (or combination of technologies) is the one that achieves the greatest net increase in benefits to society -- the difference between the value of the reduction in AEI and costs associated with achieving those reductions. The wide variation in individual site characteristics necessitates a site-specific approach to achieving this goal.

The methodology for determining BTA should consider alternative feasible technologies and operational requirements for reducing impingement, entrainment, and include the consideration of the environmental impacts of each particular technology. For each alternative, the costs and benefits should be estimated to identify the "best" alternative available to achieve 316(b) goals. Determination of BTA for CWISs at new facilities requires a reliable and effective approach incorporating well-established procedures to consider the costs and benefits of alternative technologies and operational requirements for reducing AEI at each site. Cost-benefit analysis requires the careful enumeration of the monetary value of different impacts resulting from alternative approaches to minimizing AEI. The costs included in cost-benefit assessments should reflect costs to society as a whole. The most important social costs of BTA alternatives can be organized into capital costs, operation and maintenance (O&M) costs, power costs due to implementation of BTA alternatives, and other environmental costs due to installation of BTA technologies.

Capital costs and O&M costs are relatively straightforward concepts. They represent the marginal increase in costs necessary to implement the technology alternative and the change in the costs of operating the plant that result from implementation of the technology. They include design and engineering costs, construction costs, and labor costs.

Energy costs are the costs incurred from plant shutdown during construction activities and from reduced performance as a result of BTA implementation. They include both the loss in available capacity as well as the loss in expected energy output. With increased competition in the wholesale power markets, it is possible to determine market prices for capacity and energy output.

Environmental costs reflect the cost of externalities associated with implementation of a particular combination of technologies. Examples include water contamination, air emissions, and visibility and

wildlife impacts. These costs are traditionally difficult to measure; however, markets are developing for some environmental externalities. Where markets exist, market values should be used. Where markets do not exist, an attempt should be made to include them quantitatively or qualitatively as part of the overall cost of CWIS technology alternatives. The scientific and academic communities continue to develop reliable methodologies for valuing these environmental impacts. The benefits included in the cost-benefit assessments should reflect benefits to society. This approach to measuring benefits is consistent with the Office of Management and Budget Guidelines and standard economic texts.

The cost-benefit approach to BTA determination has several important strengths.

First, consideration of the incremental costs and benefits of alternative BTA requirements allows appropriate standards to be set in individual cases without expending significant resources.

Second, a cost-benefit approach organizes information about the large number of potential BTA choices in a logical manner.

Third, the framework provides an explicit approach to accounting for uncertainty about both costs and benefits which is more reliable than the “wholly disproportionate” test discussed by EPA. Such a test is arbitrary and tends to overcompensate for uncertainty, wasting scarce public and private resources.

Evaluating these factors on a site-specific basis will always provide a superior result to a national one size fits all approach. Because of the significant variations across water body types and facility types -- within and across industries -- this is especially true for the regulation that EPA is proposing to promulgate under section 316(b).

EPA Response

EPA has fully considered each of the issues raised in the comment.

EPA disagrees with the comment that the determination of BTA for the final rule must be based on the maximization of net benefits as required under Executive Order 12886. The total annualized cost of the final rule is relatively low, under $50 million per year. As such EPA is not required to complete a formal benefits analysis under Executive Order 12886.

EPA noted the comment that the determination of BTA should consider alternative feasible technologies and operational requirements for reducing impingement, entrainment, and include the consideration of the environmental impacts of each particular technology. For a discussion of EPA's consideration of alternative feasible technologies, please see response to comment 316bNFR.068.321 and the Technical Development Document.

EPA agrees that the most important costs of BTA alternatives for electric generators include the capital costs of compliance, operating and maintenance costs of BTA technologies, power costs and environmental costs. EPA has fully considered each of these costs in the analysis of the final rule and has determined each to be acceptable. For a more detailed discussion of EPA's consideration of these

costs in the final analysis please see the response to comment 316bNFR.068.325.

Finally, the commenter indicates that considering BTA on a site-specific basis "provides a superior result to a national one size fits all approach". Track II of the final rule allows for facilities to conduct site-specific studies to demonstrate that lower cost alternatives to the BTA requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved meeting the requirements of Track I.

Comment ID 316bNFR.069.006

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

This comment was incorporated into 316bNFR.069.005.

EPA Response

No Response Necessary.

Comment ID 316bNFR.069.007

Subject Matter Code	10.0
Best Technology Available	

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WHAT IS THE EPA'S APPROACH AND WHAT IS IT TRYING TO ACCOMPLISH?

EPA proposes to establish national minimum requirements based upon the type of water body, with a requirement for additional site-specific assessment and requirements in certain water body types. This approach would set minimum requirements for flow, volume, intake velocity, and cooling water system design, based on the type of source water body and the location of the CWIS within that body. Permit writers would have an obligation to require additional site specific evaluations on top of the minimum design standards in certain water bodies and the authority to require additional controls on a case-by-case basis in all water bodies.

The EPA preamble identifies six alternatives to this approach for comment.

1.Case-by-case determinations, based upon EPA Guidance: Technology requirements are the result of case-by-case review.
2.Rebuttable Presumption of national minimum requirements: Site specific factors (cost) could be used to rebut the presumption that the national minimum technology requirements are appropriate.
3.National minimum requirements equal to a zero-intake flow requirement: National requirement for dry cooling.
4.National minimum requirements, with the option of trading among components of BTA: Allows facilities to trade off less stringent requirements in one dimension in exchange for more stringent requirements in another dimension. For example facilities could trade a more stringent flow rate for a less stringent velocity.
5.National minimum requirements that would apply the most stringent requirements to all water bodies:
6.Site specific determinations of Adverse Environmental Impact ("AEI") and BTA, based upon a tiered approach: The EPA proposes to consider a three tiered approach B screening, collection of information, and BTA selection B based on site specific information.

EPA states that it is choosing its preferred alternative "based in large measure on the Agency's experience in attempting to implement section 316(b) on a wholly site-specific basis." It identifies five concerns with the current case-by-case approach that presumably will be resolved by adopting the agency's new approach.

First, EPA claims that the current system fails to minimize AEI. The agency cites a number of individual cases where it believes that entrainment and impingement persist where 316(b) determinations have been made. EPA believes that national minimum technologies will be more effective at minimizing AEI.

Second, EPA cites the high administrative and information costs of the existing program. The agency argues that considerable resources are required of both regulatory authorities and the industry to implement the case-by-case approach. EPA believes its approach is simpler to implement.

Third, EPA claims that the case-by-case approach reduces the incentive for innovation and the development of new technologies due to the cost of pursuing permit modifications. EPA believes that more innovation will occur under a national minimum standards approach.

Fourth, EPA argues that the case-by-case approach has the potential to result in regulatory inconsistency, with different sources subject to different standards. EPA believes its approach will lead to greater consistency across sources.

Fifth, EPA argues that the case-by-case approach makes planning difficult for industry because there is no clear national standard to plan to. The lack of national minimum standards also gives insufficient guidance to regulatory agencies on the application of the standard to particular water bodies or facilities. EPA believes that taking away the discretion of facility operators and regulatory agencies will resolve this problem.

EPA Response

The final rule establishes a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements that will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of also allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

EPA believes this rule addresses the CWA's requirement to develop a regulation embodying a technology-based approach (as evidence by the phrase best technology available) to minimize adverse environmental effects of cooling water impact structures and improves upon the existing approach by addressing the concerns regarding permitting raised by the commenter. EPA believes that the rule should not ignore the record which shows that the overwhelming majority of new facilities can meet these requirements and the desire to permit new facilities expeditiously. (It is not that EPA wants permitting of existing permits to linger, but that existing NPDES permits are administratively continued under section 558(c) of the CWA; and thus delay in those permits does not delay the operation of the facility.) Population approaches, assuming they address all species of that inhabit the waterbody, not just recreationally important species, take loner to complete and are less objective for new facilities.

Comment ID 316bNFR.069.008

Subject Matter Code	9.4
Adverse Environmental Impact	

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EPA fails to develop a reasonable definition of AEI.

EPA's proposed rule does not define "adverse environmental impact" ("AEI"). Therefore, it is impossible to judge whether the approach taken by the agency minimizes AEI. The language of the preamble and the rule appear to assume that the impingement and entrainment of organisms is in and of itself AEI.

Defining the impingement and entrainment of organisms as AEI (" the one fish standard") is overly simplistic and ignores a number of important factors that will determine whether or not an environmental impact is, in fact, adverse. Because this definition ignores these factors, it is overly stringent B that is, it will lead to expenditures of resources that are not justified by the benefits that result from those expenditures. This is made more problematic because the rule contains no mechanism for comparing costs and benefits of alternatives.

A reasonable definition of AEI is based on effects on the populations of potentially affected species or aquatic community and takes into account:

--Severity of the impact with respect to the health of the natural resource.
--The ability to mitigate the resource impact.
--Cross media effects of alternative mitigation strategies.

In implementing 316(b) in the past, the agency has taken the magnitude of entrainment and impingement and its potential to affect the aquatic community into account when determining whether an AEI has occurred. Moreover, a federal court reviewing this practice has upheld this approach. (See Seacoast Anti-Pollution League v. Costle 597 F.2d 306 (1st Cir. 1979).

Of course, the one fish standard also ignores differences in the value or importance across species of organisms that might be entrained or impinged. It also treats the impacts of CWIS on aquatic organisms inconsistently and inequitably vis a vis other types of anthropogenic or natural sources of fish mortality. Society routinely accepts, and even endorses the vigorous use of the fisheries, industry as part of the normal management of aquatic resources.

The industry recommends that "adverse environmental impact" be defined as follows:

Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function and (2) is attributable to the operation of the cooling water intake structure.

This definition allows for the consideration of all important environmental factors and focuses on the correct endpoint, namely, the health of the ecosystem. There is a full discussion of this definition in

the comments filed by the UWAG. We refer the reader to those comments for additional information.

The UWAG comments also discuss in great detail the flaws in EPA's analysis of existing 316(b) studies that the agency believes demonstrate that AEI is occurring under the case-by-case approach being implemented today. We do not discuss those issues here other than to express our agreement with the technical analysis of UWAG.

EPA Response

Please see response to comment 316bNFR.507.004.

EPA has several concerns pertaining to the definition of AEI proposed by industry: (1) EPA is concerned about the level of uncertainty and subjectivity associated with identification of "representative indicator species," determining sustainability thresholds for multiple populations (see preamble section VI.B.2.c), and assessing whether or not a population is performing its normal ecological function; (2) EPA believes that managing commercial and recreational harvests does not fall within the Agency's regulatory authority; and (3) EPA believes that most aquatic organisms are subjected to multiple anthropogenic stresses and therefore it can be difficult to establish a nexus between one particular stressor and adverse environmental impact with a high degree of certainty (see preamble section VI.B.3).

Comment ID 316bNFR.069.009

Subject Matter Code	10.04
Site-specific Permit Flexibility	

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The EPA approach does not reduce administrative or information costs.

EEI understands EPA's concern with the resource requirements of a site-specific approach. However, it should be noted that the majority of the burden of such an approach - monitoring, studies, etc. - would be assumed by permittees. Moreover, EPA's proposed rule does little to reduce this burden. The rule proposes to continue to require an element of site-specific evaluation in all but a few limited cases while also imposing rigid design requirements, including maximum flow and quantity constraints on all new CWISs.

EPA's approach still requires site-specific monitoring and studies. It requires the assessment of technologies over and above the national minimum standards. It requires a demonstration that the performance standards are being met. And it requires reevaluation of all of these factors each time the permit is renewed (this is allowed but not required under the existing program). The only administrative costs that are avoided by the EPA's approach are those associated with demonstrating that the technologies chosen are socially efficient, or even cost-effective and these costs are inappropriate to eliminate because an evaluation of the cost effectiveness of technology being adopted in each case will lead to better - more socially efficient - decisions.

EEI supports a limitation of site-specific evaluations to those cases where they are absolutely necessary to address special concerns or to demonstrate the effectiveness of a less costly alternative. This will facilitate the timely permitting of critically needed new capacity.

EPA Response

Under the final rule, EPA has adopted a two-track approach, and using Track I, an extensive site specific study is not required. In Track I, as described in Section 122.21, reporting and data collection requirements are reduced. Only existing site characterization information is required to be submitted for Permit Application, along with technological information. However, Track II requires significant studies as well as the information required in Track I.

The two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the "fast track" (Track I), or by demonstrating the same level of performance as the Track I requirements under the "demonstration track" (Track II).

Under Track I, the capacity of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system and the design through-screen intake velocity is restricted to 0.5 ft/s. The rule also includes requirements that restrict the total quantity of intake in proportion to the mean annual flow of a freshwater river or stream, or the natural thermal stratification or turnover patterns of a lake or reservoir, or to a

percentage of the tidal excursions of a tidal river or estuary. In addition, the applicant must select and implement an appropriate design and construction technology for minimizing entrainment and impingement and maximizing impingement survival. EPA has also reduced burdens in Track I by allowing permit applicants to propose and install technologies to meet standards without approval of permitting authority.

Under Track II, the applicant has the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements for capacity, design velocity, and design and construction when applied to a shoreline intake at the new facility site. Proportional flow requirements also apply under Track II.

Comment ID 316bNFR.069.010

Subject Matter Code	10.01
Regulatory Framework Options	

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The EPA approach does not encourage innovation.

The approach proposed by the Agency is, by and large, a design standard. Design standards limit the incentive for the development of new or innovative approaches. Some alternative technologies will not be developed or deployed because they do not meet the narrow definition of compliance established by the standard. There is little incentive to develop technologies that exceed the standards because there is no benefit under the regulations for exceeding the standard.

The design of a CWIS that minimizes adverse environmental impact at the least cost inherently involves a number of tradeoffs. For example, a facility may be able to achieve the same reduction in impingement by installing fish handling systems, reducing intake velocity, or relocating the intake structure away from populations likely to be impinged. A more flexible standard allows a facility to choose between these options, whereas the EPA's approach removes the incentive to make socially beneficial tradeoffs in search of the best solution. EPA's approach also disallows innovative management systems that could achieve the same environmental benefit at lower cost.

EPA Response

EPA believes that the two-track approach does encourage innovation. The approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. In EPA's view, Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures. EPA believes this approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing new facilities.

Comment ID 316bNFR.069.011

Subject Matter Code	10.01
Regulatory Framework Options	

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The EPA approach leads to inconsistent environmental and economic outcomes.

EPA's approach does not eliminate regulatory inconsistency. There are two types of consistency that are relevant to this standard, consistency of inputs and consistency of results. It is consistency of results that matters from an environment and public policy standpoint. By applying identical technologies at very different facilities, the EPA is decreasing consistency of the 316(b) program. If there is currently an inconsistency in the outcomes achieved through the 316(b) program, the EPA should resolve this by clarifying what constitutes AEI and a process for assuring the right information is considered rather than by implementing a rule that requires a uniform technological standard insensitive to site specific needs.

The EPA approach does little to promote predictability or certainty.

EPA's proposal will still require extensive site-specific evaluations and technology decisions in most cases. Moreover, the proposal offers little guidance for regulatory agencies on how to interpret the requirement for additional site-specific controls. As a result the industry still has a great deal of uncertainty associated with what will be required at a particular facility. EPA may wish to argue that the rule will increase predictability because all developers and permitting authorities understand the minimum technologies that must be in place. However, any predictability added through the EPA's approach comes at the expense of flexibility and the ability to choose options that achieve similar environmental benefit at much lower cost. A system that generates results that are predictable but inefficient is not superior to a system that requires up front evaluation of a potential facility location but yields a more efficient outcome.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

The final rule has eliminated the requirement for site-specific evaluations in Track I and therefore has enhanced regulatory certainty for facilities that choose Track I.

Comment ID 316bNFR.069.012

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

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The proposed rule has a greater potential to have an adverse energy supply impact than estimated by EPA.

Energy policy has long included a concern for the environmental implications of energy supply, distribution and use initiatives. Recent occurrences in the U.S. have been quite illustrative of this interaction. Electricity plays an increasingly important role in the nation's economic growth. More and more, electricity is the ideal energy form to substitute for other inputs, which drives productivity increases and sustained economic growth.

EPA estimated that only 40 electric utility facilities would be subject to any additional requirements over the next 20 years as a result of this rule. EPA estimates that this represents just 20 percent of the new steam cycle generating capacity expected to come on-line over that time period. This estimate is inconsistent with the utility industry's experience. Therefore, EEI commissioned a study to replicate and analyze the EPA analysis.

The EPA analysis was evaluated and replicated by OnLocation, Inc. and the EOP Group, Inc. The results of this study are appended to these comments as Appendix 1. {attached}

The study identifies three major areas of concern with the EPA analysis.

1. The Resource Data International ("RDI") database that the EPA used as their baseline for screening analysis was outdated and contains a number of geographic and technical biases that permeate the EPA's analysis.

2. Limiting the screening analysis to only those plants where state permitting authorities had knowledge of the cooling water system led to an underestimate of the number of facilities affected by the rule.

3. Reliance only on the Reference Case of the Energy Information Agency's Annual Energy Outlook led to an underestimate of the total number of affected facilities.

The re-analysis identified a number of issues in EPA's analysis, including problems of geographic and technological bias in the underlying database that lead to an underestimate of new plants. In addition, EPA assumed that only 12.5 percent of new steam cycle plants would be subject to the requirements of the rule. This assumption was based on very limited information of cooling system characteristics of a small group of new plants. Additional information from a telephone survey revealed that 44 percent of new steam cycle plants are subject to the rule. Finally, EPA extrapolates the results of its analysis over a 20-year period using assumption of plant size, electricity growth, GDP growth, and natural gas prices that resulted in a low estimate of the total number of new plants. Several of these assumptions were employed in a sequential manner in the analysis, creating a compounding effect in the results. The replication of the EPA analysis, using more appropriate assumptions, resulted in an

estimate of 209 facilities that will be affected by the EPA rule B equivalent to over 60 percent of all planned new steam generation capacity. This indicates that the costs estimated by the EPA are significantly understated. It should also be noted that the EPA's incremental cost estimate is based on a specific technological and geographic mix that is significantly different from the distribution estimated by the re-analysis. This suggests that costs could have been underestimated by more than the factor of five.

The cost increase will be disproportionately higher for several reasons. There will be more coal-fired steam generating facilities subject to the rule than EPA assumes and these facilities have larger cooling systems and higher associated costs than natural gas combined-cycle facilities. In addition the EPA analysis assumed that most new facilities would use recirculating cooling systems, minimizing the incremental costs of compliance with the proposed section 316(b) rule. This proportion likely will not be the same for the larger estimate of new plants.

The results of the re-analysis have significant implications for future energy supply.

1. The analysis shows that the reach of the 316(b) rule will extend across a significant market share of new steam cycle generating plants B over 60 percent of the market. The complex regulatory processes in the rule likely will lead to additional delays in brining new electricity supply on line. In deregulated electricity markets, delays in supply expansion can lead to higher electricity prices to consumers in the short-term.

2. The incremental cost of compliance with the rule will be more than five times higher than estimated by the EPA. This will lead to higher long-term energy costs to consumers, since these higher costs will be reflected in higher electricity prices. High cost of compliance also creates additional uncertainties in the financing of new plants that could be reflected in higher costs of initial project financing.

While the authors of the reanalysis are firmly convinced that the problems with the RDI database are not insurmountable when performing an analysis of the sort the EPA is attempting here, the authors of the study recognize that EPA is not likely to find or develop an alternative database in the time available to them before court ordered final action on the new facilities proposal. Therefore, the authors suggest the following five minimum recommendations to make the EPA analysis more representative.

1. The revised analysis should be based on the most recent update of the RDI database available.
2. The screening analysis should be applied to new plants coming on-line over a longer time period than the three-year period used in the initial analysis. The analysis should consider a ten-year range if possible. The consideration of broader time period would help mitigate the problems of technology and geographic bias in the data.
3. The sub-sample of plants with information on planned cooling water systems needs to be significantly expanded. The limited number in the initial EPA analysis appeared to result in a significant underestimate. The information base can be expanded through telephone surveys of selected states, or of developers with large portfolios of planned projects, or both.
4. The extrapolation of the screening results over the 20-year period needs to reflect recent energy market trends in electricity demand growth, fuel prices and economic growth.

5. There will always be some degree of uncertainty in the estimates. This should be addressed by developing at least two scenarios, leading to a lower bound and upper bound estimate. This will result in a much better estimate of the costs (and ultimately net benefits) of the proposed 316(b) rule.

EPA's proposed approach is open ended and likely to increase the length of time required to permit a new facility that is subject to the rule. Subjecting two thirds of the steam plants that are likely to come on line to these rules is likely to result in significant delays in bringing new capacity on line. This could have serious implications for energy supply over the next 20 years.

EPA Response

This comment raises a number of issues:

(1) The proposed rule has a greater potential to have an adverse energy supply impact than estimated by EPA.
(2) EPA's estimate of the number of new in-scope electric utility facilities is inconsistent with the utility industry's experience.
(3) Costs could have been underestimated by more than the factor of five.
(4) The complex regulatory processes in the rule likely will lead to additional delays in brining new electricity supply on line.
(5) High cost of compliance also creates additional uncertainties in the financing of new plants that could be reflected in higher costs of initial project financing.

The comment also suggests five minimum recommendations to make the EPA analysis more representative.

EPA's response:
(1) EPA disagrees with the commenter's claim that the New Facility Rule has a greater potential to have an adverse energy supply impact than estimated by EPA. For a detailed discussion on issues surrounding energy effects, see EPA's response to comment 316bNFR.512.003 in comment category 23.6.

(2) EPA disagrees with the commenter's claim that EPA underestimated the number of new in-scope electric utility facilities. For information on EPA's projection of the number and cooling water characteristics of new in-scope electric generators, see response to comment 316bNFR.042.003 and Chapter 5: Baseline Projections of New Facilities in the Economic Analysis document. EPA also disagrees with the findings in the report prepared by OnLocation and the EOP Group. See EPA's response to Appendix A of EEI's NODA comments (316bNFR.525.101).

(3) The commenter asserts that "costs could have been underestimated by more than the factor of five." EPA has a sound record basis for the cost estimates for the final rule. In response to comments and additional information, EPA has made adjustments to the unit costs as well as the number and characteristics of facilities subject to the final rule. This has resulted in an increase in the estimated annualized compliance costs from approximately $12 million to approximately $48 million. EPA therefore believes that the claim that the costs are underestimated is no longer valid. For more

detail see the Technical Development Document and record for the final rule.

(4) EPA disagrees with the commenter's claim that the complex regulatory processes in the rule likely will lead to additional delays in bringing new electricity supply on line. In response to concerns about delays, EPA has designed the final section 316(b) New Facility Rule to allow for expedited permitting. The two track approach allows facilities to avoid lengthy pre-operational study requirements, as are common under the current site-specific implementation, by complying with the requirements of Track I. EPA's analysis shows that 93 percent of in-scope combined-cycle facilities and 71 percent of in-scope coal facilities already comply with the recirculating requirements of Track I in the baseline and therefore qualify for expedited CWIS permitting. The few facilities that choose to comply with Track II and have to conduct a multi-year study will have sufficient time to incorporate the study into their construction plans, because lead times for the construction of new combined-cycle and coal facilities range from three to four years (Table 43 of the Assumptions to the Annual Energy Outlook 2001). Further, EPA has explained that due to the variability and site-specific nature of impingement and entrainment, a multi-year study is necessary to have sound basis for determining comparable reductions in impingement and entrainment. EPA therefore believes that the final section 316(b) New Facility Rule will not delay new facility permitting, but in many cases expedite it as a result of better defined BTA requirements.

(5) EPA has considered the uncertainty in the financing of new plants. EPA economic analyses have shown that the costs and economic impacts of the final New Facility Rule will be insignificant and thus will not impact project financing. To account for the uncertainty, however, EPA conducted a sensitivity analysis on the length of the amortization period, which showed an insignificant increase in economic impacts. For a full discussion of the sensitivity analysis please see Chapter 7: Economic Impact Analysis of the Economic Analysis document.

Finally, EPA has considered each of the five recommendations for revision provided by the commenter. For a complete discussion of each of the five recommendations made, please see section 4 of EPA's response to Appendix A of EEI's NODA comments (316bNFR.525.101).

Comment ID 316bNFR.069.013

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

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EPA's economic analysis is fundamentally flawed and significantly understates the cost of the proposal.

In addition to our concerns with respect to the number of facilities affected by the EPA's proposed standards, we have a number of concerns with the cost estimates themselves.

For new facilities, EPA developed estimates of the costs of compliance with the proposed regulations. In its analysis, EPA estimated costs for the several different technologies or modifications facilities would be required to implement. Cost estimates include capital and operating costs, and vary across a range of parameters representing local conditions and facility characteristics such as water depth, water flow, and intake size. Other costs considered include administrative costs to obtain and renew NPDES permits and costs to comply with monitoring, recordkeeping, and reporting requirements.

The cost projections for closed-cycle cooling towers are inaccurate and understated due to the flaws in calculating the capital costs, O&M costs and dry cooling costs of constructing and operating a cooling tower. Furthermore, EPA did not consider other costs such as power costs and other environmental costs.

Regarding capital costs, EPA makes two critical flawed assumptions. First, EPA has significantly understated the costs of a cooling tower by considering only the cost of the cooling tower without the additional cost of other necessary cooling system equipment such as wiring, foundations, noise attenuation treatment, the cost of construction and other equipment. In addition, EPA's tower cost multipliers for wet-cooling towers is questionable. EPA assumes that the cost factor of $30-$50/gallons per minute ($/gpm) is constant for small towers and decreases for larger towers. These assumptions are not consistent with a number of engineering texts.

With respect to O&M costs, EPA assumes that O&M costs of 5 percent of capital costs decrease to 2 percent of capital costs due to economies of scale. To support this assumption, EPA focused on chemical treatment costs. However, contrary to EPA's assumption, data from almost two dozen power plant cooling systems demonstrate the opposite - that chemical treatment costs increase with an increase in recirculating cooling water flow.

EPA Response

At proposal, EPA's cost estimates included all of the components such as wiring, foundations, noise attenuation treatment, and the cost of construction, which the commenter claims were absent. See the NODA (66 FR 28853) and Chapter 2 of the Final Technical Development Document.

The commenter states that EPA's cost multipliers for wet-cooling towers is questionable and claims that they are not consistent with a number of engineering texts. No more information is provided and

no references to said texts were provided. Without the supporting information, EPA had no basis to revise the estimates. However, since proposal (as presented in the NODA at 66 FR 28853), EPA researched additional turn-key cost estimates from recent cooling tower construction projects (i.e., complete construction project cost quotations including all pertinent cost components) to further investigate the issue. EPA included these costs in the empirically verified cost curves used to calculate final facility level costs. See Chapter 2 of the Technical Development Document.

Since proposal, as discussed in the NODA, EPA has concluded a study of performance penalties for the operation of cooling towers at coal-fired and combined-cycle power plants. EPA has included the costs of these penalties in the final national cost estimates of this rule. See responses to comments 316bNFR.068.332 and 316bNFR.068.100.

With respect to the "other environmental costs" associated with cooling towers, the commenter has provided only a terse statement claiming that EPA has not considered them without providing supporting information or analysis. Thus these comments provide no basis to revise these estimates. EPA discusses non-water quality environmental impacts in the preamble and Chapter 3 of the Technical Development Document for the final rule.

Since proposal, EPA has reconsidered the concept of decreasing O&M percentage corresponding to increasing cooling tower size ("economies of scale"). EPA obtained further information that did not support the estimates presented at proposal and has refined its O&M cost estimates accordingly to support the final rule. See response to comment 316bNFR.068330.

Finally, EPA has removed requirements for relocation of intakes outside of the littoral zone from the requirements of the rule. See response to comment 316bNFR.014.017 or 316bNFR.009.003.

Comment ID 316bNFR.069.014

Subject Matter Code	24.5
EEA - Estimation of Benefits	

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EPA relies on a flawed analysis of benefits to justify the rule.

EPA has ignored its own guidance and good practice in assessing the benefits of the proposed regulation. In its guidance, EPA describes benefits analysis as a process to develop monetary values to inform the policy-making process. The guidance recommends ranking significant sources of benefits, assessing the quality of published studies, and explicitly accounting for uncertainty. Not only do the benefit estimates in the proposed rule meet none of these requirements, the analysis never compares costs and benefits. Additionally, there is no discussion of the uncertainty associated with either the cited studies or the uncertainty related to transferring estimates to new facilities affected by the proposed rule. When uncertainty is not considered, decisionmakers risk making choices based on highly over- or understated benefits or risk.

The general approach for assessing the benefits of environmental policies as stated in EPA's guidance requires three steps. The first step is to evaluate which effects are likely to be significant in the overall benefit analysis. EPA fails to provide any rationale for the benefit categories that were included or excluded or to establish links between identifiable environmental outcomes of the policy and monetary benefits. Therefore, it is impossible to assess benefits claimed.

The next step is to communicate with other experts to ensure that the information provided is both adequate to support the benefits analysis and includes a discussion of the uncertainty of the estimates of physical effects. EPA's benefits analysis fails to discuss how either the baseline conditions or policy-induced changes at the study sites differ from those of the policy sites.

The third step requires assessing the quality of studies used to transfer benefit estimates to expected policy outcomes. However, EPA does not evaluate the quality of any of the studies used to transfer benefits estimates, and does not follow its own guidance for reviewing available studies for quality and applicability. The studies included in the proposed rule fail to satisfy the agency's own standards for benefits transfer.

EPA cites five studies that estimate the physical effects of cooling water intake structures, but relies on only four that provide benefit estimates of the physical effects: Rowe et al (1995); Huppert (1989); Jones and Sung (1993); Ronafalvy et al (1999). The agency's choice of benefits studies does not follow procedures specified in its own guidance. Specifically, EPA fails to:

*Evaluate the quality of the analysis and reliability of methods used in the reference studies;
*Show that the studies cited in the proposed rule are relevant to the facilities that will be affected by the policy or how estimates should be modified to account for differences with policy sites;
*Document reported values, citing values that do not exist in the studies themselves; and
*Evaluate sensitivity of results to assumptions and to provide decision makers with an assessment of uncertainty in the estimates.

The proposed rule provides no motivation for choosing the particular studies selected from the large literature on aquatic benefits. Since 1990, at least 24 studies have been published that value changes in angler catch. In comparison EPA's studies are very dated. Furthermore, 15 of the 24 newer studies used random utility models, which represent the best current practice according to EPA guidance. Only three of the studies EPA chose contain estimates of dollar values and only one uses the random utility model. Additionally, it is not clear where EPA derived the dollar values reported from two of the studies, Ronafalvy, et al (1999) and Huppert (1989).

Moreover, it appears studies were not chosen for their quality and applicability but for their focus on impacts specifically related to cooling water intake structure technology. This criterion is far too restrictive and eliminates many studies far superior to those selected. The benefit estimate needed to assess the policy presented in the proposed rule is the value of increased catch per trip. The mechanism that results in the increased catch is irrelevant to estimating accurate consumer-surplus measure of such changes. Thus, EPA's analysis fails to follow their own guidance and good professional practice, which requires that the analysis use studies that provide the most reliable estimates of such values for sites that are as comparable as possible to sites affected by the regulation.

Another concern with EPA's benefits analysis of the ' 316(b) rule relates to the sample calculations of total consumer surplus that could be generated by improvements in cooling water intake structure technology. Specifically, EPA assumes that nonuse benefits are 50 percent of use-value benefits, but has provided no justification for this assumption.

Nonuse values are values the people hold for a resource without using or visiting that resource. While there is agreement that these values exist, there is disagreement on whether these values should be included in a cost-benefit analysis. In the case of the 316(b) rule, it is likely that affected resources will involve relatively common lakes or streams with many substitutes. Affected water bodies also may have low baseline water quality, regardless of the cooling water intake structure technology in place. These resources have low-valued attributes and awareness declines rapidly with distance from the site. The combination of these factors leads to the conclusion that, in most cases, the nonuse benefits for cooling water intake structure improvements will be insignificant. The arbitrary assumption that nonuse benefits are 50 percent of use benefits has no basis and significantly overstates realized benefits.

In addition, EPA limits the discussion of nonuse values to environmental commodities. If nonuse values for the environmental benefits of a change in technology are to be included in the cost-benefit analysis, EPA should also investigate and quantify any other positive or negative nonuse values that may potentially occur.

EPA Response

This comment suggests that EPA may have provided decision-makers with "highly over- or under-estimated of benefits" because uncertainties were not explicitly included in the quantitative benefits analysis. In reality, EPA did not provide quantitative estimates of risks or benefits, due in large measure to the very uncertainties noted in the comments. The Agency did note several examples of

studies that have examined the magnitude of impingement and entrainment (I&E) losses at some CWIS, and presented those studies as indicators of the potential benefits that might arise from regulatory actions to reduce I&E.

The comment also describes the steps involved in a benefits analysis, raises concerns about the 5 studies cited in the EEA (Chapter 11) that discuss I&E impacts at existing facilities, and points EPA to numerous studies available in the literature on valuing changes to fisheries. In regard to the 3-step process for developing a benefits analysis, EPA acknowledges these to be a logical sequence if the Agency were to develop a quantitative benefits analysis, but EPA points out that no such analysis could be done reliably for new facilities (see response to comment 316bNFR.068.333). With regard to the intent and use of the 5 studies cited in the EEA, EPA notes that the studies have not been used in a benefits transfer for the new facilities rule, and instead the studies are provided only as illustrative examples of what has occurred in the past in terms of I&E impacts at existing CWIS (see response to comment 316bNFR.068.334).

With regard to commenter's point that at least 24 other valuation studies were available to consider in a benefits transfer, EPA agrees that there is a large body of literature covering empirical research on the economic values associated with recreational angling. If the Agency believed that it were feasible to conduct a reliable, quantitative assessment of benefits for the new facilities rule, then it would consider the full range of prior research in order to identify which studies were most applicable in a benefits transfer to the species and locations impacted by new facility I&E (see response to comment 316bNFR.068.334).

The commenter also indicates that "it is not clear where EPA derived the dollar values reported from two of the studies, Ronafalvy et al. (1999) and Huppert (1989)." With regard to the Ronafalvy et al work, this study is only cited in relation to estimated increased impingement survival at Salem using fish baskets. This is not an economic valuation study and was not used as a source of any monetized benefits values. This report was used solely to indicate the physical impact of a technology on impingement.

In using the Huppert (1989) research, EPA estimated values for willingness to pay (WTP) to avoid a 1 fish per trip decrease (and also estimated willingness to pay to enjoy a 1 fish increase) in catch rate for Chinook salmon or striped bass in California, using the data and results reported in the Huppert 1989 study. This study reported that average WTP per angler per year to avoid a 50% reduction in catch was $59.64, and WTP to have a 100% increase in catch was $76.81 (these are average values obtained from a travel cost model and a contingent valuation model, updated to year 2000 dollars). The average angler took 6.2 trips per year and caught 1.36 salmon/striped bass per trip, which equates to 8.432 fish per year. Therefore, an increase of one fish per trip could be estimated as $76.81 per year (the WTP to double annual catch) divided by 8.432 fish per year of additional catch, which equals $9.11 per fish in 2000 dollars (or $8.87 in 1999 dollars, as reported in the EEA). Note that this is an average value across the 8.432 additional fish caught, and at the margin the first added fish presumably would be worth more than this average value (due to decreasing marginal utility). In similar fashion, using the estimated average WTP to avoid a decrease of 50% per trip yields a "per fish" estimate of $14.14 ($59.64 in year 2000 dollars, divided by 4.216 fish, which is equivalent to the $13.77 in 1999 dollars as reported in the EEA).

The comment also raises the issue of nonuse values, and whether they should apply to the 316b rulemaking. This issue has been addressed in response to comment 316bNFR.068.335.

Comment ID 316bNFR.069.015

Subject Matter Code 10.01

Regulatory Framework Options

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There is no biological basis for the standards that the EPA has chosen.

EPA's choice of waterbody types to distinguish the likelihood of possible impacts is not sufficiently refined. The broad waterbody categories chosen by EPA do not appropriately account for site-specific differences between waterbody types. Without the support of sound science such arbitrary selections will lead to inefficient regulatory outcomes.

EPA's choice of broad categories ignores the wide variation in ecological sensitivity within each of these water body types. Not all areas within an estuary, or "littoral zone" will be equally productive or sensitive to the effects of a CWIS. Because the differences within one of the EPA classifications could be far greater than the variation between classifications, the standards, as proposed, will likely lead to inefficient, or even perverse environmental outcomes. Moreover, standards based on water body type remove the incentive to make welfare enhancing location decisions within a water body type. In other words, there is no regulatory benefit for seeking out a non-productive portion of a given water body type.

EPA Response

EPA has evaluated available data and believes that the requirements set for flow, cooling water system design, and intake velocity in the final rule do have a biological basis. EPA also believes that the examples of environmental impact provided in the proposed and final rules are illustrative of the types of effects associated with cooling water intakes (See Section VII. of the proposed rule, Section III of the final rule).

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types. New facilities will have flexibility to locate intake structures wherever they choose and to utilize technology appropriate for site-specific conditions as long as the requirements of Section 125.84 are met.

Comment ID 316bNFR.069.016

Subject Matter Code 10.03

Additional Littoral Zone Requirements

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EPA's definition of the "littoral zone" is inappropriate, given the desired regulatory outcome. Moreover, the choice of the "littoral zone" to represent the area of greatest environmental sensitivity is misguided.

The EPA defines "littoral zone" with reference to plant production rather than fish production. Moreover, the location and depth of a littoral zone is dynamic and influenced by many natural and anthropogenic factors that the EPA does not consider.

Use of the littoral zone as the regulatory standard also ignores a number of important factors that influence entrainment and impingement. There are areas within littoral zones that are not attractive or useful to fish. There are also many water bodies where the littoral zone, as defined by the EPA, represents such a large proportion of the water body that it is no longer a meaningful distinction.

In addition, for some species, location of the CWIS outside the littoral zone could actually increase entrainment and impingement. For example, some species make little use of the littoral zone and location of the CWIS in the littoral zone would be more protective.

There is also insufficient empirical evidence that CWIS located in littoral zones are responsible for causing AEI.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.069.017

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Subject Matter Code 10.0

Best Technology Available

The individual standards for flow, cooling water system design, and intake velocity do not appear to have any biological basis. These issues are discussed in great detail for each standard and waterbody type in the UWAG comments. A summary of those comments here would not do them justice; therefore, we refer the reader to them for a full discussion of these issues.

EPA Response

As required under 316(b), this final rule establishes best technology available to minimize adverse environmental impact (AEI). For the criteria specified in the statute (location, design, construction and capacity), EPA has identified factors that contribute to AEI, examined technologies that address these key factors, and established requirements based on which of these requirements or combinations of these requirements are available, effective, and economically practicable. The final rule requirements are predominantly technology-based, and have been developed to address the impingement and entrainment impacts resulting from cooling water intake structures.

Comment ID 316bNFR.069.018

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

Author Name C. Richard Bozek
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EPA's rule contains no legitimate consideration of costs.

Consideration of costs in establishing a standard under section 316(b) is certainly not prohibited by the statute, definitely encouraged by the legislative history and the past actions of the agency, and, we would argue, required of the agency. The agency proposed four alternative tests for determining whether the costs of the rule are practicable.

1.Whether the costs of the rule are wholly disproportionate to the environmental benefits achieved by the alternative.
2.Comparison of the costs of compliance to the revenue at a facility.
3.Comparison of compliance cost to the total cost of constructing a facility.
4.Comparison of the compliance cost to the discounted cash flow due to the construction of the new facility.

Of the four tests, only the wholly disproportionate test considers both the costs and the benefits. However, it still ignores the relationship of incremental costs to incremental benefits necessary to determine whether an alternative is actually welfare enhancing. Moreover, the agency never defines what "wholly disproportionate" means.

EPA proposes to use the comparison of compliance costs to revenue as the appropriate test. This alternative, as well as options three and four, are affordability tests. While affordability is a useful concept it is not helpful in making regulatory decisions regarding the maximization of benefits, because benefits are not taken into consideration in any way. Affordability ignores the incremental effects of the standard, as well as any indirect effects, positive or negative, associated with the standards.

As a result, affordability provides precious little information that is useful in determining whether a particular standard is warranted. Moreover, affordability does not make an allowance for the ability of facilities and regulatory authorities to develop solutions that achieve the same environmental outcome at lower cost.

It should also be noted that, by comparing costs to total revenues from electric generation, the agency is ignoring all other costs associated with the generation of electricity. The appropriate test of affordability is cost/net revenue.

The rule also considers cost in the context of individual permit negotiations if the facility can demonstrate that the costs they face are wholly disproportionate to the costs considered by the agency in establishing the standard. This cost test is inappropriate for a number of reasons including:

*As discussed above, the costs considered by the agency have no relevance to the social efficiency of the underlying standard.
*The cost test for an individual facility also has no relationship to the affordability of the standard that

the agency believed was appropriate to judge the standard nationally.
*The cost test does not allow for the facility and the permitting agency to consider mutually beneficial alternatives that could achieve the same or better environmental result at lower cost. This seems wholly inappropriate and shortsighted on the part of the EPA.

EPA Response

EPA notes the commenter's concern about use of an affordability test in establishing BTA. However, EPA has adopted the cost to revenue test for determining economic practicability. For more detail please see response to comment 316bNFR.206.014 in comment category 10.11 and the preamble to the final rule.

EPA disagrees with the commenter's claim that the appropriate test of affordability for this rule is cost/net revenue. A cost/net revenue test would require information on the costs associated with the generation of electricity. Since this rule regulates new facilities that have yet to be constructed, this information is not available. In addition, the results of EPA's economic practicability analysis have shown minimal impacts on electric generators subject to this regulation. EPA therefore does not believe that further tests, which would only increase the uncertainty in the estimates, are warranted.

Comment ID 316bNFR.069.019

Subject Matter Code 10.01

Regulatory Framework Options

Author Name C. Richard Bozek

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EPA's standards represent a "belt and suspenders" approach to regulation.

Many of the provisions in EPA's proposed rule appear to be redundant with one another. EPA has chosen conservative standards on many margins, the net result of which is a set of standards that is overly stringent.

For example, the rule contains location requirements designed to keep CWIS from being constructed in sensitive areas. Then it further reduces impact by establishing a volume of flow restriction that minimizes the likelihood that AEI will occur by ensuring that an insignificant proportion of the water body's flow is taken in through the CWIS. This part of the standard is more made more conservative by the fact that the agency ignores the survival rate of entrained organisms. It then goes on to limit the total volume by requiring closed-cycle cooling. It the flow rate from an already insensitive location is already protective, what is the added benefit of limiting the total amount of water taken in? A similar situation exists for the standards designed to limit impingement.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

EPA does not believe that the performance standards are redundant - they are additive. EPA is to minimize impacts to the smallest amount and additional measures may be warranted for site-specific conditions. The volume and flow requirements are maintained in the final rule. EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.).

Under this final rule closed-cycle cooling is not required. Facilities can consider any available technology for implementation as long as the requirements of Section 125.84 are met.

Comment ID 316bNFR.069.020

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 20.8

Duties of Federal Agencies, and Authorized Tribes and States

The rule, as proposed, would remove authority from states to make reasonable environmental policy decisions.

In addition to the fact that the proposed standards prohibit the permitting authority from adopting permit conditions that could achieve greater or equal environmental standards at lesser cost, the EPA's rule prohibits permitting authorities from considering the adverse environmental impacts from cooling towers or other technologies required by the rule. Not only does this framework prevent the state permitting authorities from making wise decisions that are mutually beneficial with the regulated community, it is insulting and assumes that left to their own devices the states would make bad environmental decisions. This is not supported by the history of implementing the 316(b) program in the states.

EPA Response

EPA has established the requirements of this rule for the reasons set forth in the preamble to the rule. EPA notes that a significant number of states support EPA in establishing a technology-based minimum floor, analogous to the technology-based rules EPA establishes for industrial dischargers under sections 301, 304, and 306 of the CWA in order to limit the permitting burden on the states at least in the context of new facilities who the record demonstrates are technically and economically able to meet these requirements. See 2-034A and 2-035B in the Docket. EPA notes that the majority of states that have commented on the rule favor EPA establishing a national minimum technology requirement that simplifies the permitting burden for new facilities. EPA also believes that Track 2 affords sufficient flexibility if another technology suite reduces impingement mortality and entrainment to reductions comparable to those achieved by meeting Track 1 requirements. Finally, as always, and as is consistent with section 510 of the CWA, states may always be more stringent than these national minimum requirements.

Comment ID 316bNFR.069.021

Subject Matter Code	12.4
Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility	

Author Name C. Richard Bozek

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The EPA is exceeding its authority by requiring a specific type of cooling water system.

The EPA's standard reducing intake flow to a level "commensurate with a closed cycle recirculating cooling water system" is a legal fiction. In fact the only way of complying with this provision is to install a closed cycle cooling water system. The EPA's General Counsel has already concluded that the agency does not have the legal authority to regulate the cooling water system, only the intake structure. This regulatory framework circumvents that limitation on the agency's authority.

Moreover, the utility industry has demonstrated that it can minimize AEI without relying on closed cycle cooling. As discussed above, this portion of the proposed standard is also redundant, given the conservative nature of the other provisions in the standards. Therefore, this requirement is unnecessary.

EPA Response

See responses to comments #316bNFR.068.010 and #316bNFR.068.011.

Comment ID 316bNFR.069.022

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name C. Richard Bozek

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The EPA fails to consider potential adverse environmental impacts associated with any of the provisions of the rule, including the operation of cooling towers.

Many of the provisions of the standard can, in fact, have adverse environmental impacts at a particular site. For example, limiting intake velocity can fail to send an appropriate danger stimulus to some fish species -- increasing the level of impingement or entrainment. EPA's failure to consider these factors on a site specific basis has the potential to lead to perverse environmental outcomes, and the rule limits facilities' and permitting authorities' ability to address these issues.

The potential adverse effects associated with cooling towers are also well documented and include:
*Particulate emissions, salt drift and other effects of the evaporative process.
*Increased fuel consumption and emissions due to energy penalty
*Increased need for water treatment and pollutant discharge or disposal.
*Increased land use requirements.

EPA's failure to consider these factors and, more importantly, its exclusion of their consideration by state permitting authorities can lead to the imposition of standards that represent a net environmental loss at some locations.

EPA Response

See responses to comments 316bNFR.014.019 and 316bNFR.068.100.

Comment ID 316bNFR.069.023

Subject Matter Code	7.1
Definition: New Facility	

Author Name C. Richard Bozek

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The rule contains an ambiguous definition of “new” facility

EPA’s proposal defines the term "new facility" as any building, structure, facility, or installation that meets the definition of "new source" or "new discharger" in 40 CFR 122.2 and 122.29(b)(1), (2), and (4); commences construction after the effective date of this rule; and has a new or modified cooling water intake structure that withdraws cooling water from waters of the U.S. However, a new facility is defined to mean “new source” or “new discharger” in 40 C.F.R. "122.2 and 122.29(b)(1), (2), and (4). 65 Fed. Reg. 49,116 col. 3. Section 122.29, in turn, includes criteria for new source determinations that cover any source (1) which “totally replaces the process or production equipment that causes the discharge of pollutants at an existing source, or (2) has processes “substantially independent of an existing source at the same site.”

It does not appear from the plain language of the proposal that EPA means to be so sweeping in its definition of a new facility. Nor do we believe that EPA means to include sweeping in existing sources performing simple routine maintenance. Therefore, EPA should clarify that routine maintenance, replacement or repowering of an existing facility would not trigger new facility 316(b) requirements.

EPA Response

See response to 316bNFR.030.003.

Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. Thus, the definition of a new facility in the final rule applies to a facility that is repowered only if the existing facility has been demolished and another facility is constructed in its place, but modifies the existing cooling water intake structure to increase the design intake capacity. In this way, the rule allows for numerous types of changes to existing facilities, while defining new facilities in a manner consistent with existing NPDES definitions addressing new sources and new dischargers.

EPA has not defined “routine maintenance” in the final rule because clarifying what constitutes routine maintenance is not vital to the definition of new facility. Under the new facility rule, to be considered a new facility a facility must be a new source or new discharger and use a newly constructed cooling water intake structure or a modified existing cooling water intake structure whose

design intake has been increased. Thus, changes to a cooling water intake structure at an existing facility that is not a new source or new discharger are not subject to this rule. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule.

Comment ID 316bNFR.069.024

Subject Matter Code MISC

Miscellaneous Comment

Author Name C. Richard Bozek

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EEI believes it is incumbent on EPA to carefully consider and weigh the large amount of technical, biologic, economic and engineering data that has been submitted as a result of this rulemaking, to compare this information with EPA's stated goals and systematically to evaluate the proposed rule in light of empirical evidence and concerns that have been voiced about the potential widespread adverse environmental impact occurring.

The clear message is that no single parameter (like velocity or volume of intake water) can reliably predict environmental impact. Environmental impact depends on what species are present, how they lay their eggs, what is the nature of the shore and the water bottom, temperature, and many other factors, including the design of the intake structure.

Any final action should provide for a flexible approach that accommodates these facts by allowing a tailored, site-specific approach for complying with the requirements of the statute. To make this work, EPA should define AEI in terms of population level impacts and apply a cost-benefit test specifically designed to "optimize" the choice of technology. In addition, EPA should encourage the application of incentives (such as minimizing regulatory review) with an option to comply with specific conservative criteria that would be considered to satisfy the requirements 316(b). This approach is simple and focuses the expenditure of analytical and technical resources in those areas where they are likely to have the greatest potential to generate environmentally favorable outcomes. Focusing on the environmental outcome at a facility, rather than the technical inputs, will also lead to a more consistent set of standards across the country. While not every facility will look the same or have the same design elements, they will all have negligible impact on the environment. This expectation will help facilities and permitting authorities to plan better and it will send the correct incentives for location and design of cooling water intake structures.

EEI and its members stand ready to work with EPA and other stakeholders to develop an acceptable approach that would be biologically sound, environmentally protective, administratively efficient, and cost-effective.

EPA Response

EPA has reviewed and considered the technical, biological, economic and engineering data that has been submitted to EPA as public comment. EPA has established a national technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities for minimizing adverse environmental impact associated with the use of these structures. EPA agrees that there is not one single factor that can predict environmental impact. For these reasons, EPA established a final rule which incorporates a suite of technologies or parameters to minimize the adverse environmental impacts resulting from cooling water intake structures. EPA disagrees that it should apply a cost-benefit test specifically designed to "optimize" the choice of technology. Instead, EPA has taken a technology-based approach to the rule

and has
determined what requirements are technically available and economically practicable using a cost to revenue test. EPA's record supports that the final rule is scientifically based, technically sound, protective of aquatic resources, and technically available and economically practicable.

EPA disagrees that it should limit the definition of AEI to population level impacts. As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems, to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

Finally, the final rule does incorporate a flexible approach with the two-track framework. See response to 316bNFR.023.011.

Comment ID 316bNFR.069.025

Subject Matter Code	10.01
Regulatory Framework Options	

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EPA has stated that its main objectives in this rulemaking are to:

*increase environmental protection;
*reduce the administrative costs of implementing section 316(b); and
*improve the consistency and predictability of its application.

Unfortunately, in an attempt to achieve these objectives, EPA has constructed an overly simplistic approach that artificially matches particular physical and engineered facility characteristics with certain waterbody types. For example, for CWISs located in sensitive areas (which are broadly defined as anywhere in an estuary or "littoral zone"), the agency's control technology standards are based on performance characteristics of a single overprotective technology (recirculating cooling i.e., cooling towers). However, the technology chosen by the Agency (i.e., wet or dry cooling towers) is not a cooling water intake structure and thus it is beyond EPA's authority under section 316(b) to set requirements that essentially establish cooling towers as BTA.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. EPA is not requiring specific BTA a facility can consider any available technology for implementation as long as the requirements of Section 125.84 are met.

See also response to comment 316bNFR.006.005.

Comment ID 316bNFR.069.026

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name C. Richard Bozek

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EPA's approach fails to accomplish its goals because:

1.Requiring an independent site-specific evaluation to determine whether additional control measures (over and above the mandated technological requirements) are necessary retains all of the transactions costs associated with the currently employed case-by-case approach, without any of the benefits in balancing costs and benefits that approach provides. Maximizing net benefits on a site-specific basis will result in the greatest increase in social welfare.

2.The assumptions made in the biological, technological, legal and economic components of the proposed rule do not accurately reflect the consensus of scientific opinion, have little basis in empirical evidence, and are unsubstantiated.

3.EPA avoids defining adverse environmental impact. If there is no definition of what constitutes adverse environmental impact, how can it be determined if a permittee succeeds in its minimization?

4.Without some criteria for AEI it is impossible for the regulated community to satisfy the dictate of the statute. Unless a permute can identify what is AEI, he cannot minimize it.

5.The end result of the rule will be inconsistent environmental outcomes that are an artifact of the arbitrary assumptions upon which the standards are based.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

EPA believes that the scientific, technological, legal and economic basis of the regulation is valid. For new facilities subject to this rule EPA chose the two-track option as the Agency believes it represents the best technology available for minimizing adverse environmental impact. With respect to new facilities, the technologies used as the basis for this option are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts.

EPA has identified factors that contribute to AEI, examined technologies that address these key

factors, and established requirements based on which of these requirements or combinations of these requirements are available, effective, and economically practicable. The final rule presents these technology-based performance requirements in a two-track approach that can be implemented on a site-specific basis as deemed appropriate by the applicant as long as the requirements of Section 125.84 are met.

Comment ID 316bNFR.069.027

Subject Matter Code MISC

Miscellaneous Comment

Author Name C. Richard Bozek

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The Agency does recognize in the proposal the critical importance of its own past precedent and 25 years of experience that dictates that 316(b) decisions inherently require site-specific analysis if a proper and effective best technology available is to be selected. Unfortunately, the Agency does not seem to have had adequate time to conduct a satisfactory analysis to develop a framework sufficient to incorporate any meaningful site-specific application.

EPA Response

The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I establishes specific requirements for a suite of technologies that would represent best technology available for minimizing adverse environmental impact. However, under Track II, an applicant has the opportunity to conduct site-specific studies to demonstrate that alternative technologies or configurations, including the relocation of an intake, will reduce impingement and entrainment to a level of reduction comparable to the level achieved if the facility implemented the Track I technology-based performance requirements.

Comment ID 316bNFR.069.028

Subject Matter Code 10.03

Additional Littoral Zone Requirements

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EPA also recognizes that some parts of waterbodies are more "sensitive" or "productive" than others and may need special consideration. However, it relies on an overly broad, simple and scientifically unsupported definition of "littoral zone" as a surrogate for more appropriate site-specific information. It also wrongly assumes that locating a CWIS any place within an estuary automatically creates an adverse environmental impact.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define the best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.069.029

Subject Matter Code	8.1
Identification of New Steam Electric Facilities	

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The simplified approach EPA has suggested in its preferred alternative leads to a restrictive and costly rule. What's more, the likely number of facilities affected by this rule is far greater than EPA suggests. When this is weighed with the fact that the electric power market is changing at an unprecedented pace at the same time when there is a substantial growth in the demand in for electric power, it is very clear that an "optimized" solution for the environment, energy policy and economic reasons is required. Only a method that will maximize the net benefits and minimize the costs is appropriate in this context. EPA owes the public a thorough analysis of the costs and benefits of the rule using a framework that allows for optimized decisionmaking and expenditures. It has not provided such an analysis.

For these reasons, EEI believes that EPA needs to do additional analysis and thinking regarding a decision framework that accomplishes its goals. In performing its economic analysis of the proposed rule, EPA has not done a defensible job of properly assessing the number of facilities likely to be affected by the rule. In fact, our re-analysis of EPA's work shows that EPA possibly underestimated the number of potentially affected facilities by a factor of five (See Appendix 1: Analysis of the Number of New Generating Facilities Subject to the Proposed 316(b) Rule.). {attached} Further, the Agency has not accurately reflected the costs for each affected facility to comply with the proposed regulation, thereby compounding the error in its overall estimate of economic impact even further. For example, EPA assumes that five out of seven plants (71 percent) in its initial study would employ recirculating cooling systems in the absence of the rule, thereby minimizing the incremental costs of compliance. EPA's analysis also is heavily influenced by the assumption that new plants will employ natural gas combined-cycle technology that has lower incremental compliance costs than coal-fired facilities. We believe that these assumptions also underestimate the proposed rule's effects.

Equally troubling is the fact that due to time constraints, EPA says it has not conducted a complete review of costs and benefits associated with choosing various technological options (BTA) that may satisfy the minimization of adverse environmental impact component of the statutory requirement. Moreover, the technology that the rule embraces, cooling towers, has practical constraints, environmental and economic costs that EPA has not yet explored on the administrative record. EEI maintains that EPA must redo its economic analysis and conduct a benefits assessment. Without this work, EPA simply has not met its statutory duty to propose regulations that would minimize adverse environmental impact.

The importance of 316(b) rules goes beyond their cost implications for any specific plant, although cost issues are likely to be significant. Requirements imposed under 316(b) may create undesirable energy supply consequences such as effects on plant availability or overall decreases in power production and/or maintenance problems, and may even affect overall system deployment.

EPA Response

EPA disagrees with the commenter's claim that EPA needs to conduct a complete review of costs and benefits. The cost of the final rule is estimated to be relatively low, less than $50 million dollars per year. Further, EPA has addressed its benefits assessment elsewhere in this comment response document.

EPA disagrees with the commenter's claim that EPA underestimated the number of impacted facilities by a factor of five. For information on EPA's projection of the number and cooling water characteristics of new in-scope electric generators, see response to comment 316bNFR.042.003, Chapter 5: Baseline Projections of New Facilities in the Economic Analysis document, and the Technical Development Document. EPA also disagrees with the findings in the report prepared by OnLocation and the EOP Group. See EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113).

EPA also disagrees with the comment that cooling towers have "practical constraints, environmental and economic costs that EPA has not yet explored on the administrative record." EPA has considered the environmental impacts of operating closed-cycle cooling towers and believes that the technologies determined to be BTA have acceptable non-aquatic environmental impacts. The non-aquatic environmental impacts are associated with increased air emissions (SO2, NOX, CO2, and Hg) resulting from cases where facilities with once through cooling systems are required to install recirculating systems with cooling towers. The increased SO2, NOX, CO2, and Hg attributed to facilities that would be required to install wet cooling towers in lieu of once-through cooling systems is negligible in comparison to the total annual air emissions from new power plants. For more detail please see response to comments 316bNFR.068.100, 316bNFR.014.019, and 316bNFR.068.332, and the preamble to the final rule.

Furthermore, EPA disagrees with the commenter's claim that "EPA's analysis [...] is heavily influenced by the assumption that new plants will employ natural gas combined-cycle technology that has lower incremental compliance costs than coal-fired facilities." EPA's estimate of the number of new combined-cycle and new coal facilities is based on new capacity forecasts for the two technologies by the Department of Energy. These forecasts show significantly greater combined-cycle capacity additions compared to coal capacity additions.

Finally, EPA disagrees with the commenter's claim that "[r]equirements imposed under 316(b) may create undesirable energy supply consequences such as effects on plant availability or overall decreases in power production and/or maintenance problems, and may even affect overall system deployment." For a detailed discussion on issues surrounding energy effects, see EPA's response to comment 316bNFR.512.003 in comment category 23.6.

Comment ID 316bNFR.069.030

Subject Matter Code MISC

Miscellaneous Comment

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Water is central critical to the functioning of many electric generation facilities and ancillary operations. Therefore, EEI is concerned that the actions proposed by the Environmental Protection Agency in this rulemaking may impair the ability of power generation facilities to operate efficiently, from both an environmental and an economic perspective. EEI submits these comments on the EPA's recently proposed 316(b) standards for new facility cooling water intake structures.

EPA Response

EPA disagrees that the final new facility rule will impair the ability of power generation facilities to operate efficiently, from both an environmental and an economic perspective. First, the controls required under the new facility rule appropriately reflect technologies that do not have unacceptable non-aquatic environmental impacts (including impacts on the energy supply across the United States), and that reduce impingement and entrainment of aquatic organisms in a manner that will help support, maintain, and protect aquatic ecosystems. Second, with respect to new facilities, the technologies used as the basis for this rule are commercially available and economically practicable for the industries affected as a whole. EPA has taken into account any efficiency loss or “energy penalty” resulting from these
requirements and has incorporated these into its costing and determination of economic practicality for the final rule.

Comment ID 316bNFR.069.031

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

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Instead of a rebuttable presumption, we encourage EPA to develop a rule that allows for a full and fair site-specific consideration of both the potential for "adverse environmental impact" (AEI) and, if there is such a potential, what is the "best technology available" (BTA) to minimize the AEI. A refinement of the current alternative could provide an equally acceptable "track," that provides incentives to promote the use a technology that is highly protective. For example, an incentive for choosing such protective technology could be the minimized the need for additional regulatory review.

It's important to note the site-specific option would not necessarily require a resource-intensive, year long study, for every site. Existing data should be used as much as possible, and would be adequate for assessment in most cases. Moreover, the applicant should be allowed to use a tiered approach that would quickly identify sites that would not cause AEI because of a suitable location, low volume of intake water, facility design, or the species of fish at the site. If these screening criteria did not identify the site-CWIS combination as one that would not cause AEI, the applicant could either proceed to a site-specific study to identify and characterize the AEI or else proceed directly to identifying BTA. At any time the applicant could jump back to the protective technology track and simply opt for the chosen technology. If EPA would develop such a two-track approval process, with neither track a "presumption," it would have several advantages. For one thing, it would give the applicant a choice. The applicant would be free to either take advantage of the conservative, approved technology rule or else spend money and effort on fact-finding, whichever best suited the particular needs of permittee and project resources. Also, a two-track rule would be consistent with past successful 316(b) permitting determinations, in which the permittee assessed the potential for AEI and, if AEI was likely to occur, proposed an alternative as BTA, then demonstrated why the recommended alternative should be approved. Finally, the two-track rule would be consistent with EPA's long-term strategy of emphasizing market incentives and other nontraditional regulatory mechanisms instead of "command-and-control" regulations.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

All cooling water intake flow results in the potential for impingement and entrainment. For this reason, EPA did not adopt an approach in the final rule that focuses primarily on assessing whether population effects have been proved to be caused by the CWIS. Rather, the rule establishes technology-based performance requirements and offers new facilities the option of meeting the required levels of performance through the use of those technologies that most effectively reduce harmful environmental impacts at their site. This is particularly appropriate at new facilities where installing the same technology up front is much less costly than retrofitting the technology. Nevertheless, consistent with

the comment, the final rule offers a fast-track (Track I) under which requirements have been streamlined to promote certainty and faster permitting, as well as a more flexible track (Track II), under which applicants can demonstrate the sufficiency of alternative technologies. The applicant retains the choice of which track to pursue.

Comment ID 316bNFR.069.032

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Although dry cooling systems are not required as part of the proposed 316(b) rule, they would be required in the "zero flow" regulatory alternative considered by EPA. As such, EPA calculated costs for dry cooling systems. However, there are important flaws in EPA's analysis. EPA attempts to make a direct cost comparison between dry cooling systems and wet cooling systems but does not provide cost equations or curves for dry cooling. EPA implies, though, that it relied on similar curves and flow volumes used for wet cooling towers. If this is in fact true, this methodology is fundamentally flawed because there is no cooling water flow in dry cooling towers. Therefore, there is no equivalent to the $/gpm factor used to calculate the costs of a wet cooling tower. This objection to EPA's methodology also extends to EPA's assumption that O&M costs for wet cooling towers are related to O&M costs for dry cooling towers. There is no foundation for this assumption. More detailed analysis should be performed before making such an assumption.

EPA Response

EPA acknowledges that its methodology for estimating costs for dry cooling towers is somewhat unconventional in that it utilizes wet cooling flow as a design variable. However, EPA points out that, in defense of its empirically verified models, the fundamental concept of condensing steam is the same for wet cooling as for dry cooling. This is due to the fact that the same relative amount of energy is required to condense steam regardless of the cooling technique. It is upon this principal that EPA derived the analogous methodology between wet cooling and dry cooling, despite the differences in system operations. Additionally, EPA's cost curves are empirically verified against real-life, turn-key costing data from recent dry cooling construction projects. Further, see Chapter 2 (costing) of the Technical Development Document, response to comment 316bNFR.068.031, and the NODA (66 FR 28853).

Comment ID 316bNFR.069.033

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

To truly estimate the cost and benefits of the proposed rule, EPA must consider power costs and other environmental costs. Closed-cycle cooling towers reduce the performance of generation facilities by increasing auxiliary power loads and reducing the efficiency of the steam turbines through turbine backpressure. This may result in reduced capacity to end users requiring replacement from other sources and increased fuel requirements resulting in costs to society in general and the facility specifically.

Finally EPA considers a very limited range of technologies and modifications when evaluating options to reduce impingement and entrainment, and offers inadequate rationale for excluding many effective technologies.

EPA Response

EPA has included the energy penalty of cooling towers in the cost estimates for the final rule. See responses to comments 316bNFR.068.332, 316bNFR.524.046 and 316bNFR.501.024.

EPA considered a wide range of technologies for reducing impingement and entrainment of aquatic organisms. See Chapter 5 of the Technical Development Document. EPA provided information in the proposal for as many technologies as it was aware through the information collection process and through public comment. In addition, EPA conducted significant outreach to stakeholders to discuss technology developments. Since proposal, EPA has received, through comments, information from only a select few entities regarding emerging technologies and has included information on these in its analyses and discussions in the final rule and supporting documents. The commenter provides no examples of the "many effective technologies" they claim EPA has excluded. Therefore, EPA cannot further incorporate the comment.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Nam H. Baek

On Behalf Of:

OxyChem

Author ID Number:

316bNFR.070

Note

Fully supports and incorporates by reference the comments made by ACC (316bNFR.035)

Comment ID 316bNFR.070.001

Author Name Nam H. Baek

Organization OxyChem

Subject Matter Code 7.4

Water Withdrawal threshold

OxyChem strongly believes that the proposed rule should be applied only to cooling water intake flows that are clearly demonstrated to have caused significant adverse impacts on indigenous fish population. For that reason, the flow threshold to be subject to this rule should be 25 MGD of daily maximum actual intake or 10% of the source water 7Q10.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

It is also important to note that EPA has removed the low flow percentage threshold from proportional flow requirements of the rule. EPA believes the mean annual flow provides a sufficient measure of the conditions EPA seeks to protect.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.070.002

Subject Matter Code 7.1

Definition: New Facility

Author Name Nam H. Baek

Organization OxyChem

The proposed rule (65 FR 49066) said that routine maintenance and repair to an intake structure which is currently withdrawing cooling water and does not result in an increase in design capacity is not considered a modification. OxyChem contacted the EPA (Deborah G. Nagle) by phone to confirm if pumping rate increase up to the design capacity for additional water demand would be NOT considered as a new source. The EPA agent responded that it is NOT a new source. We request this clarification should be in the permanent record.

EPA Response

EPA has not defined "routine maintenance" in the final rule because clarifying what constitutes routine maintenance is not vital to the definition of new facility. Under the new facility rule, to be considered a new facility a facility must be a new source or new discharger and use a newly constructed cooling water intake structure or a modified existing cooling water intake structure whose design intake has been increased. Thus, changes to a cooling water intake structure at an existing facility that is not a new source or new discharger are not subject to this rule. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule.

Comment ID 316bNFR.070.003

Subject Matter Code 7.1

Definition: New Facility

Author Name Nam H. Baek

Organization OxyChem

OxyChem also requests clear definition of "substantially independent" as a "stand-alone" facility." For example to enhance energy efficiency, OxyChem pursues cogeneration projects that are integral to chemical manufacturing. Additional water demand for cogeneration is sometimes attained by increasing design capacity. Because such cogeneration projects are NOT substantially independent of the existing facility at the same site, they should not be considered new sources

EPA Response

With regard to defining when a facility is substantially independent under 40 CFR 122.29, EPA does not believe it is feasible to project under what circumstances owners and operators are free to select any location they desire for a new facility. For this reason, EPA takes the facility as it is planned for purposes of determining whether it is a new facility. In the final rule EPA does not believe it is appropriate to define the phrase “substantially independent” as used in 122.29(b)(1)(iii) as facilities that could be practicably located at a separate site. Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether ... processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." With regard to co-generation facilities, they would be included in the definition of a new facility if the facility is a separate and independent operation and the cooling water intake structure used by the original facility is modified by constructing a new intake bay for the co-generation facility or is otherwise modified to increase the intake capacity of the cooling water intake structure.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Terry Coss

On Behalf Of:

Xcel Energy

Author ID Number:

316bNFR.071

Comment ID 316bNFR.071.001

Subject Matter Code	7.1

Definition: New Facility

Author Name Terry Coss

Organization Xcel Energy

What Is a "New Facility"?

The wording in this section is rather confusing in that EPA states that modifications to existing facilities would not be covered under this rule yet also states that modifications resulting in increased capacity would be covered. Applying the new facility standards to existing facilities could discourage utilities from repowering or upgrading the efficiency of their existing facilities if they would need a small appropriation increase. The incremental increase in impact would seem to be much less for a small capacity increase than it would be to build a new facility or even a new intake structure. Increasing efficiency at existing facilities should be encouraged rather than penalized.

EPA Response

Under the final rule, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility, and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule.

The definition of a new facility in the final rule applies to an existing facility that is repowered or upgraded only if the existing facility has been demolished and another facility is constructed in its place, but modifies the existing cooling water intake structure to increase the design intake capacity. Further, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility (e.g., partial repowering), and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. EPA does not agree that by not addressing most repowering under this rule the Agency is creating an incentive to use less efficient technology. Both the power- generating and manufacturing industries routinely seek greater efficiency when repowering. This is illustrated by the increased use over the past 10 years of combined-cycle technology, which requires significantly less cooling water for a given level of power generation and is a more efficient process than older technologies.

Comment ID 316bNFR.071.002

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 7.1

Definition: New Facility

EPA also states that routine maintenance would not trigger new facility status. The term routine maintenance needs to be carefully defined to avoid the problems utilities have encountered when completing maintenance on their facilities. They later discover, according to EPA interpretation after the fact, that they in fact were performing modifications not maintenance and therefore should have undergone environmental reviews for the project.

EPA Response

EPA has not defined "routine maintenance" in the final rule because clarifying what constitutes routine maintenance is not vital to the definition of new facility. Under the new facility rule, to be considered a new facility a facility must be a new source or new discharger and use a newly constructed cooling water intake structure or a modified existing cooling water intake structure whose design intake has been increased. Thus, changes to a cooling water intake structure at an existing facility that is not a new source or new discharger are not subject to this rule. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule.

Comment ID 316bNFR.071.003

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Terry Coss

Organization Xcel Energy

What Is a "Cooling Water Intake Structure"?

It would seem that developing a definition for intake structures should be fairly straightforward and lend itself well to establishing a national standard. However the great diversity of existing intake structures in operation across the country contradicts this premise. While defining a cooling water intake structure as all of the physical structures and technologies up to the first set of pumps may be suitable in many cases there are numerous exceptions. In western states where water is a commercially valuable commodity cooling water may be withdrawn from such sources as irrigation systems or other water conveyance systems.

For instance, one of our plants obtains its water in the following manner. There is a diversion dam diverting water from a creek through a head gate to an irrigation ditch. The water flows several miles to a point where flow can be diverted to a surface impoundment. During that several-mile span, the water flows in an open ditch as well as several sections of underground pipe prior to entering a surface impoundment. In the impoundment, there is a screened structure where the water flows by gravity through an underground pipe directly to a valve that allows water to enter the plants cooling system. There are no pumps associated with this particular system.

Defining these networks as cooling water intake structures would be very cumbersome and unwieldy to regulate. This would be particularly problematic if the proposed rule were applied where the regulatory trigger for the percent of water used for cooling was reduced to 5 percent of the total capacity. Clearly the one size fits all approach to intake structures would lead to numerous complications for the regulatory agencies. If this national standard approach proves difficult in an issue that is relatively straightforward we can only imagine the complications that will arise if a national requirement is to be applied to the diversity natural aquatic systems found across the country.

EPA Response

The final rule defines "cooling water intake structure" to mean the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. EPA has not defined the phrase an “associated constructed waterway.” Whether or not a waterway is considered part of the cooling water intake structure can vary depending on the location, type of facility, and other factors. EPA has left this determination up to the permit writer, who will evaluate each situation on a case-by-case basis. See Reponses to Comment 316bNFR.027.005.

In addition, in the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the intake pumps. EPA has not changed the twenty-five (25) percent threshold, but has placed the threshold in the applicability section of the final rule. Cooling water intake structures below this threshold are not subject to the final rule; however, permit writers should determine any appropriate section 316(b) requirements for structures withdrawing less than 25 percent of intake flow

for cooling purposes on a case-by-case basis.

Comment ID 316bNFR.071.004

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Terry Coss

Organization Xcel Energy

Must my Facility Withdraw Water From Waters of the U.S.?

EPA states that with a capacity trigger of 2 MGD the regulation would cover 99.97 percent of cooling water flows. EPA also states that if the trigger flow were increased to 25 MGD the regulation would still address 99.1 percent of cooling water flows. Thus more than an order of magnitude increase in the capacity trigger would result in a reduction of less than one percent of cooling water flows being regulated. Does the workload increase at EPA generated by the 2- MGD flow trigger justify including less than one percent of additional cooling water flows?

Do these percentages apply to planned new facility intake capacity or to existing facility intake capacity? EPA later states in Section VII.A. that of the known planned new generating facilities potentially regulated by this rule none were projected to use more than 20 MGD. Why is EPA using existing facilities to determine potential impact of a rule to regulate new facilities unless it intends to enact similar restrictions on existing facilities?

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow (estimated total flow is approximately 9 billion gallons per day) and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

The two MGD threshold applies to new facilities. Existing facilities will be addressed on Phase II and

III regulations.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.071.005

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Terry Coss

Organization Xcel Energy

What Constitutes Adverse Environmental Impact Under this Proposed Rule

If the measure of the rule is to minimize adverse environmental impact it follows that a definition of adverse environmental impact is critical to the enforcement of the rule. EPA offers several alternatives for determining adverse environmental impact. In the first case listed entrainment or impingement of more than one percent of the aquatic organisms in the near field would be considered adverse. Yet there is no discussion of the probability of returning those organisms to the source water alive and healthy through modern screening technology. Larval fish are highly susceptible to impingement and entrainment yet their first year survival in many cases is less than one percent. Does it really impact a community to take one percent or less of a population where survival is extremely low even without considering human induced impacts? Adverse environmental impact should be defined as measurable impacts affecting aquatic populations or communities not impact to individual organisms and should be balanced against other non-aquatic environmental impacts.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.071.006

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Terry Coss

Organization Xcel Energy

What Are the Proposed and Alternative Regulatory frameworks for Today's Proposed Rule?

EPA describes several optional frameworks for how the rule would be designed. The first proposal involves setting national minimum standards for cooling water intakes based on type of source waterbody, location of the intake in the waterbody, the volume of water withdrawn, and the design intake velocity. The sensitivity of the water body and/ or the specific location of the cooling water intake would determine the specific impingement and entrainment reduction measures required. The promulgation of national standards may make permitting more straightforward and make permit conditions more uniform across the nation, as well as ease the workload on permitting agencies. Given the wide variability in waterbody types, cooling water intake needs and technologies, and the diversity of aquatic communities across the nation one national standard would severely limit the flexibility required to achieve optimum operational needs within reasonable cost restraints. The ability to meet a national standard could eliminate numerous bodies of water from consideration, in areas sorely in need of additional generation, with no determination of potential environmental impact.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.071.007

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

The historical approach using a case by case determination offers the permittee some degree of flexibility in cooling water intake siting and design but yields less uniformity in permit conditions and increases the permitting agency workload.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.071.008

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 10.07

Decision Criteria for Determining Best Technology Available in a Case-by-Case

The establishment by EPA of decision criteria to guide a case by case approach would retain much of the flexibility in permitting but could increase the uniformity of permit conditions by following a uniform set of decision criteria.

EPA Response

The final for new facilities rule adopts a two-track technology-based approach that balances the need to provide clarity, consistency, and fast permitting, through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This two-track approach allows, under Track II , a case-by-case determination of best technology-available guided by the performance requirements specified in Track I. The final regulation, as well as sections V and VII of the preamble to the final rule, describe how each Track can be implemented. EPA did not adopt decision criteria to applied on a case-by case basis for the reasons discussed in VIII.A.1 of the proposed rule and II.C of the preamble to the final rule, including that this approach takes a longer period of time than makes sense for new facilities, particularly when the record demonstrates that a large number of new facilities planned to meet the requirements independently of the rule.

Comment ID 316bNFR.071.009

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

The development of a rebuttable presumption that a given set of uniform national requirements reflect BTA yet allow the facility the option to demonstrate they can meet the minimal adverse impact criteria through other means may be a reasonable compromise. This method would provide a degree of uniformity in permit conditions, allow the permittee-needed flexibility, and limit agency workload.

EPA Response

Same as 316bNFR.027.011.

Comment ID 316bNFR.071.010

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The use of dry cooling systems could be an alternative for reducing impact on aquatic organisms. However making it the national standard would unnecessarily limit siting options due to the physical space requirements for this type of cooling towers. The non-aquatic environmental impacts for generating additional electricity to make up for the reduced efficiency and increased in house electrical demands also needs to be considered.

EPA Response

Regarding space requirements of dry cooling see response to comment 316bNFR.027.012.

EPA considered the nonaquatic environmental and energy impacts of dry cooling. See Section V.C of the preamble to the final rule and responses to comments 316bNFR.068.332 and 316bNFR.206.014.

Comment ID 316bNFR.071.011

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 10.12

Request for Comment: Best Technology Available Requirement "Trading"

EPA considered an alternative allowing the ability to trade among various technology components of BTA to achieve equivalent reductions in adverse environmental impact. The approach would provide facility owners with needed flexibility to meet requirements by compensating for not incorporating one technological fix by over-compensating on another technology but still achieving the same impact reduction goal.

EPA Response

See response to 316bNFR.008.009.

Comment ID 316bNFR.071.012

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

EPA also considered a tiered process for permitting cooling water intake structures and other site specific alternatives that would offer some flexibility to facilities depending upon their willingness to conduct studies to determine if impacts may occur and to what extent impact reduction technology would be required. Providing facility owners with the ability to determine their own options to achieve impact minimization goals allows them to work with all aspects of the proposed project to come up with the most reasonable combination of solutions for their given situation.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001. The rule allows facility owners to choose between the clear requirements of Track I and the potentially greater time and effort, but broader flexibility to work with all aspects of the proposed project, offered under Track II.

Comment ID 316bNFR.071.013

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Terry Coss

Organization Xcel Energy

Location

EPA proposes to regulate the siting of cooling water intake structures by requiring increasingly stringent protection for the littoral zones (or other sensitive areas) of the source water body. EPA defines littoral zone as that region along the shoreline that supports submerged aquatic vegetation or to that portion of the substrate that receives one percent of incident light. In non-tidal rivers submerged vegetation may be affected by current velocity as much as by light penetration and, in addition, the depth to which one percent of incident light penetrates can vary significantly by season. Not all areas within a littoral zone are equally productive and in some cases may be less productive than other areas with the source waterbody. The definition of littoral zone needs to be refilled to provide facilities with a more reliable indicator of the extent of the littoral zone if it is to be used as criteria to evaluate intake location.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.071.014

Subject Matter Code 13.0

Best Technology Available-Velocity

Author Name Terry Coss

Organization Xcel Energy

Flow and Volume

Nowhere in the discussion of velocity or flow volume does EPA discuss screening methods that can protect aquatic organisms at higher velocities and flows. EPA does discuss the suitability of these technologies under Section VllI.A.5, Additional Design and Construction Technologies. Intake screen systems can be designed to handle higher velocities and especially greater volumes yet filter out organisms and return them to the source water body in a condition that they can survive. Flexibility in the regulations allowing a combination of technologies to meet a given target would provide cooling water users with options in designing intake structures.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Comment ID 316bNFR.071.015

Subject Matter Code	12.1
	Freshwater Streams/Rivers

Author Name Terry Coss

Organization Xcel Energy

Setting maximum facility volume based on the flow of the source waterbody may be appropriate in many situations. EPA states that based on their numbers 18,000 river miles could support a large utility generating plant's water needs. The distribution of these river miles is not discussed and the lack of suitable river reaches in some regions could eliminate or greatly reduce the possibility of meeting regional electrical power needs.

EPA Response

For riverine facilities, EPA estimated the number of available river miles available to support average facilities within the utility, nonutility and manufacturing sectors. For each sector, an average design intake flow was derived from facilities in the 67th percentile and higher and weighed against data collected from EPA's BASINS program. Segments deemed "available" are able to support the representative facility. That is, siting a facility of a particular size at that location would not withdraw more than 5% of the mean annual flow of a particular waterbody.

BASINS characterizes river segments on a scale of zero to six, with zero representing the largest segments. A "zero" segment typically discharges to the open ocean or large estuary. A representative "zero" segment would be the Mississippi Sound. A "one" segment discharges to a "zero" segment, and so on. The main stem of the Mississippi is a "one" segment.

EPA believes the distribution of available river miles will not adversely affect regional electrical power needs. While EPA conducted its original analysis of river mile availability based on the size of existing facilities, this does not necessarily characterize the design and configuration of future generating stations. Recent trends in the electric generating industry have incorporated more advanced technologies, including combined-cycle turbines and recirculating cooling systems, which are more energy efficient and require less cooling water.

EPA estimated the average generating capacity for planned facilities to be approximately 750 MW using the NewGEN database. Data from EPA's survey questionnaire indicates the average design intake capacity for 750 MW facilities sited on a freshwater stream or river to be approximately 400 MGD. If the predicted trends are accurate, a significant number of additional river miles would be available for use.

Information regarding the historical mean annual flow for most freshwater rivers and streams can be obtained from the US Geological Survey's website at: water.usgs.gov/nwis/sw.

Comment ID 316bNFR.071.016

Subject Matter Code 13.1

Requirement of 0.5 fps

Author Name Terry Coss

Organization Xcel Energy

Velocity

The Sonnichsen study cited by EPA found that an intake velocity of 1.0 ft/ s was protective for the species studied. EPA then applied a safety factor of two, reasoning that should be protective for most fishes, and developed a national standard threshold of 0.5 ft/s. EPA goes on to state that two different velocities were considered; approach velocity and through screen (technology) velocity. Approach velocity was defined by EPA as having the most influence on aquatic organisms and their ability to escape impingement or entrainment. EPA goes on to state that through-screen velocity will always be greater because of the reduced open screen area. EPA proposes to use through screen velocity as the criteria even though approach velocity has been the standard for years and already has a built in safety factor of two. EPA also states that 0.5 ft/s may be overly protective for some species and not protective enough for other species. Does it then make sense to set a national standard given the wide range of suitable velocities that might achieve the goal?

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement

Also, EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement.

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

Comment ID 316bNFR.071.017

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Terry Coss

Organization Xcel Energy

What Is the Role of Restoration Measures?

Restoration measures are a valid tool for minimizing impact to aquatic communities. Discretionary and voluntary restoration would be the preferred approach. The implementation of restoration measures could provide compensation where other impingement or entrainment reduction measures were not feasible, cost prohibitive, or could not achieve the desired goal. A system of restoration banking would offer facilities another viable option for meeting their impact minimization goals. Restoration measures could be an especially effective tool to deal with minimizing impacts to specific or important species.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.071.018

Subject Matter Code	16.2
Request for Comment: Establishing Alternative Requirements	

Author Name Terry Coss
Organization Xcel Energy

Additional and Alternative BTA Requirements

EPA proposes to allow the Director to set alternative BTA requirements that are less stringent than the national requirements but only if compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during rule development. By not comparing the costs of the technology to the environmental benefit gained EPA is forcing facilities to incur significant costs for questionable environmental gains. In addition, technology costs can increase significantly especially when that technology is being required. There must be a mechanism for periodic re-evaluation of the cost numbers for them to remain realistic.

EPA Response

See response to comment 316bNFR.027.020 for an explanation of the approach EPA adopted with respect to variances for new facility CWISs. See preamble section VIII and accompanying support document entitled: Economic Analysis of the Final Regulations Addressing Cooling Water Intake Structures for New Facilities.

Comment ID 316bNFR.071.019

Author Name Terry Coss

Organization Xcel Energy

Subject Matter Code 16.4

Request for Comment: Provision for Variance for Any National Best

Other Approaches Being Considered by EPA

One alternative considered by EPA involves allowing variances from the national BTA requirements based on the use on innovative cooling water intake designs to minimize adverse impact. EPA should encourage innovation in intake location and technology to further the development of new and improved fish protection technologies.

EPA Response

EPA believes it has maximized the use of innovative technologies in a manner consistent with expeditious permitting for new facilities by establishing the Track 2 requirements in the rule. Today's rule would allow and encourage the consideration of such technologies when evaluating the suite of technologies that would help the facility comply with the requirements of this rule.

Comment ID 316bNFR.071.020

Subject Matter Code	18.2
Compliance Cost/Revenue Test	

Author Name Terry Coss

Organization Xcel Energy

How Is Cost Being Considered in Establishing BTA fir New Facilities?

EPA discusses several options for using as cost tests associated with the proposed rule. The option, compliance cost/revenue test, was chosen as the most appropriate based on agency experience using this test and the data needed to calculate the costs are generally available. EPA goes on to state that compliance costs for steam electric utilities at between 0.1 and 4.4 percent of revenue. Given the current movement to deregulation and competition in the electric industry the estimation of revenue from new projects will be considerably less precise than was the case in a regulated environment.

EPA feels these percentages to be of minimal significance. From a business perspective, even if the numbers seem relatively small, if there is no comparison of costs to benefit gained there is no way to determine if it is money well spent. There needs to be some mechanism that considers the cost/benefit of regulations that incrementally increase construction and operational costs by many millions of dollars for a product that is essential for peoples' daily lives.

EPA Response

EPA has considered the commenter’s concerns. EPA recognizes that there is some uncertainty regarding revenues for some industries but remains confident that the use of the of a compliance cost/revenue test to demonstrate that the proposed requirements are economically reasonable is the appropriate measure available. EPA evaluated the requirements of the final rule by considering the cost of the rule as compared with the revenue of a facility, as well as the cost compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA, to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA.

EPA disagrees with the comment that a cost-benefit analysis is required. The total annualized cost of the final rule is relatively low, under $50 million per year. Further, the final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. The technologies used as the basis for the final rule are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts. See 316bNFR.206.014. Similarly, the technologies used as the basis for this option also have acceptable non-aquatic environmental impacts. EPA has considered the potential benefits associated with the implementation of these technology requirements; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures.

Comment ID 316bNFR.071.021

Subject Matter Code 19.2

Baseline Biological Characterization Study

Author Name Terry Coss

Organization Xcel Energy

Source Water Baseline Biological Characterization Data

EPA proposes that new facilities implement BTA for their intake structures. If the facility already proposes to use BTA what is to be gained by conducting extensive studies of the source water body. EPA proposes using a national standard, yet still requires site specific studies. Studies should be required only if the facility requests implementation of alternative intake structure technology requirements.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.071.022

Subject Matter Code 19.2

Baseline Biological Characterization Study

Author Name Terry Coss

Organization Xcel Energy

EPA's estimate of costs for the Baseline Biological Study seems unrealistically low. It is unlikely that anyone would be able to collect one year worth of data that could adequately characterize a source water body for $32,000. The only way that could be completed is if another facility had recently completed a Baseline Study on the same body of water and the data from that study could be used. Based on our experience any data more than about five years old is considered unacceptable based on changes in water quality, species composition, or some other physical or political variable. EPA bases their estimate on the less comprehensive nature of the Baseline Study compared to historical 316(b) studies. Yet in the description of required data they describe a study to determine the presence of fish and shellfish (eggs, larvae, post larvae, juveniles, and adults) in the source water body and to document their presence during the course of a year in terms of the kinds, numbers, life stages, and duration of occurrence in the source water body in the vicinity of the intake structure. This describes a fairly detailed, comprehensive, and time consuming study of the aquatic biota over the course of a year. Sample collection alone is time consuming but analysis and identification of samples of aquatic insects and ichthyoplankton is extremely labor intensive. An estimate of $100,000 may be more realistic but likely is still too low.

EPA Response

See Response to Comment 316bNFR.501.027.

Comment ID 316bNFR.071.023

Subject Matter Code 20.2

Monitoring Requirements

Author Name Terry Coss

Organization Xcel Energy

What Would I Be Required To Monitor

As was commented earlier, if the facility has already chosen to implement BTA what is the justification for requiring follow-up monitoring? If the facility requested alternative intake technology then some follow-up monitoring may be necessary to assess the effectiveness of the chosen technology.

EPA Response

The purpose of collecting this data is to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. These data would also be used by the permitting authority in subsequent permit terms to determine whether additional or modified design and construction technologies are reasonably necessary.

Comment ID 316bNFR.071.024

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Terry Coss

Organization Xcel Energy

As a regulatory objective EPA should establish a goal of impact minimization and then through guidance allow facility owners the flexibility of how best to achieve that goal for their facilities. Site specific conditions need to be considered to assure adequate protection of the aquatic community without needlessly requiring facility owners to invest in costly technologies that yield little if any environmental benefit. Encouraging owners to be innovative in developing impact minimization technologies is beneficial for all. Prescribing national requirements for the variations in cooling water intake structures and source water bodies would be severely limiting in many cases.

EPA Response

See response to comment 316bNFR.071.006.

In EPA's view, Track II does provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures for site-specific conditions.

Comment ID 316bNFR.071.025

Subject Matter Code EXIST

Existing Facility Rule

Author Name Terry Coss

Organization Xcel Energy

EPA states that this proposed regulation will apply to"new facilities" but in several instances there are indications that it will be extended in at least very similar format to existing facilities. Impact minimization at existing facilities will be much more challenging. Many existing facilities lack the necessary space to adapt most of the technologies (cooling towers, recirculation systems, or even new cooling water intakes) required by this proposal. When dealing with existing facilities the rules must provide them with the ability to enlist a combination of technologies in an attempt to reduce impacts with the understanding that minimization may not have the same meaning as it does for new facilities.

EPA Response

See response to comment 316bNFR.064.002 and the preamble to today's rule.

Comment ID 316bNFR.071.026

Subject Matter Code 22.1

CWIS Impacts and Benefits

Author Name Terry Coss

Organization Xcel Energy

The proposed rules could have a significant impact on Xcel Energy and many other utilities' ability to site new facilities to meet the growing regional demand for elecrticity.

EPA Response

See response to comment 316bNFR.014.023 above.

Comment ID 316bNFR.071.027

Subject Matter Code EXIST

Existing Facility Rule

Author Name Terry Coss

Organization Xcel Energy

Developing proposed rules for existing facilities based on the proposed rules for new facilities could have a chilling effect on electrical utiliy's ability to meet existing and projected demand for electricity across the country.

EPA Response

EPA believes that today's final rule for new facilities will not interfere with the industry's ability to meet our nation's energy needs. EPA expects that Phases II and III existing facility rules will contain options which will address both the need to protect our aquatic organisms while continuing to provide for our nation's energy needs.

Comment ID 316bNFR.071.028

Subject Matter Code 20.6

Monitoring Schedule

Author Name Terry Coss

Organization Xcel Energy

The monitoring regimen proposed by EPA requires at least two years of monitoring following permit issuance (at the discretion of the permitting authority monitoring may be required every year) and monitoring the year prior to application for a new permit. EPA goes on to state that with each permit renewal, the applicant would continue to monitor individual aquatic organisms that are impinged or entrained. This would require each new permit holder to essentially monitor impingement and entrainment continuously for the life of the facility. It is unlikely that EPA or the State Agencies will have the time or manpower to review all of these reports annually.

EPA Response

EPA is requiring that facilities monitor impingement monthly and entrainment biweekly for the first two years of the initial permit for each new facility. After that period of time, the permitting authority may require less frequent monitoring if they believe that they can collect representative data using the less frequent schedule. EPA believes that a minimum amount of data is necessary to effectively evaluate the operations of the facility and provide sufficient data to characterize impingement and entrainment at each facility.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Hanneke Counts

On Behalf Of:

South Carolina Chamber of Commerce

Author ID Number:

316bNFR.072

Comment ID 316bNFR.072.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

The New Facilities Rule Must Be Evaluated In The Context Of The Upcoming Proposal Related To Existing Facilities.

Even though the current proposal is aimed at new facilities and new cooling water intake structures, many of the provisions in the new facility proposed rule must be viewed in terms of the upcoming proposal on existing intakes. As EPA is well aware, throughout the United States there are a variety of manufacturing facilities as well as utilities that utilize cooling water and therefore have some type of cooling water intake structure. Most of the existing intake structures have been in existence for decades, and those decades of experience have produced no evidence that there is widespread adverse impact to aquatic biota from these intake structures. Certainly, very large intake structures, especially if located in an ecologically sensitive zone, may result in adverse environmental impact. EPA's goal should be to assure that the resources of the regulatory agencies as well as regulated entities are focused on the type of situations that present significant potential for causing adverse environmental impact and therefore warrant further investigation.

EPA must establish a practical and realistic threshold approach for both the new facility rule and the existing intake rule. This threshold approach would be used to determine which cooling water intake structures would be subject to the requirements of the Section 316(b) regulations.

EPA Response

See response to comment no. 316bNFR.035.005 and the preamble to the final rule.

Comment ID 316bNFR.072.002

Subject Matter Code 7.4

Water Withdrawal threshold

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

EPA Should Consider Design versus Actual Flow as the Basis of the Threshold Cutoff.

For new facilities, because there is no actual flow experience and the design flow is readily available, we agree with EPA's proposal to apply the threshold to intake design flow. When EPA develops a threshold for the existing facility rule, though, reliance on design flow would be inappropriate, for several reasons. For one, design flow may not be ascertainable for older facilities, and the facility may actually be withdrawing more water than the intake structure design flow. Most importantly, design flow will often substantially overstate the true impact that the intake structure has on the source water.

Many facilities have actual intake flows far below the intake structure design flow, either because the intake structure was "over-designed or because the facility has substantially reduced its water usage over time. Treating such an intake structure as if it really were withdrawing at a much higher rate and therefore as if it has greater potential to affect the source water would be unrealistic. Moreover, this situation could remove an incentive for further water usage reductions.

Therefore, we recommend that EPA substitute "actual intake flow" for "design intake flow" in the proposed regulatory language for existing structures and should also include a definition of that term. We suggest that "actual intake flow" be defined as "the highest 30-day average intake flow during the last 5 years." This is a number that should be easy for facilities to determine, and it would assure that a longer averaging period is not masking any peak withdrawal periods.

EPA Response

This rule applies to new facilities that use cooling water intake structures. The Phase II and III rules will address existing facilities.

Comment ID 316bNFR.072.003

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

This comment was incorporated into 316bNFR.072.002..
Comment deleted. Text incorporated into 316bNFR.072.002

EPA Response

No Response Necessary.

Comment ID 316bNFR.072.004

Subject Matter Code	7.1
Definition: New Facility	

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

Definitions Of New And Existing Facilities Need Clarity.

If EPA proceeds with the approach in the proposed standard for new facilities, setting stringent default requirements for location and operation of cooling water intake structures, it definitely will be necessary to develop a different set of requirements for existing facilities. As EPA noted, at 65 Fed. Reg. 49064, there are numerous ways in which existing facilities will be more limited in their ability to comply with specific requirements. These include limitations on the location of the intake structure or the percentage of the receiving waters withdrawn through the structure, because the facility's location is fixed, and its manufacturing equipment has already been designed and installed.

Specifically, in terms of the new facility rule, we maintain that EPA must clearly define the applicability of the proposed rule, so that it only covers a "greenfield" plant or a new, substantially independent plant co-located with an existing plant and requiring a new or expanded intake structure. EPA has based the proposed new facility requirements on the assumption that the owner has the option of choosing the location for the facility to allow him to comply with the intake structure location and operation requirements. EPA should make it clear that the "substantially independent" test is based on whether the facility owner could practicably locate the facility elsewhere.

EPA Response

This rule applies to new facilities. Existing facilities will be addressed under future rulemakings (i.e., Phase II and Phase III).

See response to 316bNFR.030.003.

With regard to defining when a facility is substantially independent under 40 CFR 122.29, EPA does not believe it is feasible to project under what circumstances owners and operators are free to select any location they desire for a new facility. For this reason, EPA takes the facility as it is planned for purposes of determining whether it is a new facility. In the final rule EPA does not believe it is appropriate to define the phrase “substantially independent” as used in 122.29(b)(1)(iii) as facilities that could be practicably located at a separate site. Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether ... processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." EPA does not think it is feasible for the permit authority to judge whether the facility could have been elsewhere for the purpose of determining whether the facility is subject to the new facility rules.

Comment ID 316bNFR.072.005

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

Subject Matter Code 7.4

Water Withdrawal threshold

EPA's Proposed Threshold Of 2 mgd Is To Low.

We strongly support the inclusion of a threshold for application of the 316(b) standards for new facilities, which would avoid applying burdensome procedures to thousands of intake structures with little or no potential for causing adverse environmental impact.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.072.006

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

We believe that the proposed cutoff level of 2 million gallons per day (mgd), however, is too low to accomplish that task. Accordingly we urge EPA to revise this level and set a reasonable threshold for the application on these Section 316 (b) rules.

EPA recognizes that a 2 mgd threshold would still leave almost all of the cooling water flows subject to regulation - 99.97 percent in EPA's judgment. 65 Fed. Reg. 49068. It should be obvious that, if exempting smaller sources has any legitimacy at all, as we (and apparently EPA) believe it does, a cutoff that removes only 0.03% of the intake water flows from the regulatory program is inadequate.

Several of our member's manufacturing facilities have cooling water intakes with flows as high as 144 mgd. These facilities have been in existence for decades with no significant adverse environmental impact. It is especially important in the context of the rule for existing facilities that the threshold and other provisions of the rule be established to prevent the unnecessary burden of retrofitting facilities that have existed for decades and are not causing adverse environmental impact.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA has concluded that the compliance costs for this rule are economically practicable and achievable for the industries affected. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available.

For further discussion of these points, see Sections VI.A.3 and VIII of the preamble to the final rule, and the Economic Analysis.

Comment ID 316bNFR.072.007

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

In Determining If An Intake Is Primarily A "Cooling Water Intake" Or A "Process Water Intake" EPA Should Use "Major Use" Rather Than The Arbitrary 25% Value As Currently Proposed.

The Agency's proposed rule defines a cooling water intake structure as the total physical structure and any associated constructed waterways used to withdraw water from a water of the United States, provided that at least 25 percent of the water withdrawn is used for cooling purposes. As noted by EPA the definition wording "....of at least 25 percent of the water withdrawn is used for cooling purposes ..." is a change from the 1976 final rule and 1977 draft guidance definition which stated "…. A facility used the major portion of water drawn through the structure. EPA also states in the proposed rule that "In practice many permitting authorities have interpreted that definition to apply to intake structures in a facility uses more than 50 percent of the water drawn…"

The past interpretations have kept the definition of cooling water intake structure simple. The majority use of the intake water will label the use of the intake structure. Accordingly, we suggest that the Agency adopt a threshold that is simple and in keeping with past (i.e., 1976 final rule and 1977 draft guidance) as well as current practices. Therefore we recommend that the Agency use a "major" use standard to determine if an intake in question is a cooling water intake structure. Thus, if the majority (>50%) of the water is used for cooling purposes, it is a cooling water intake structure, if the majority (>50%) of the water is used for process water, it is a process water intake structure.

Additionally, many industrial facilities often preheat process water with energy captured from operations inside the facility. A common way of doing this is to run the water first through a use where heat will be transferred to the water (such as in a steam condenser) and then use it for other for process purposes. Compared to the alternative of discharging the waste heat to the environment in cooling water, this practice conserves both water and energy. Because of the clear environmental advantages of reusing this water and capturing what would be otherwise wasted energy, such waters should be excluded from the definition of cooling water.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to

cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.072.008

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Hanneke Counts

Organization South Carolina Chamber of Commerce

EPA Must Establish a Reasonable Definition of Adverse Environmental Impact.

The definition of "adverse environmental impact" (AEI) is extremely critical in terms of this rule as well as the forthcoming proposal on existing cooling water intake structures. Since the Utility industry and EPRI have substantial long-term experience with 316 (b) issues in general, and specifically on an improved definition of AEI, we strongly encourage EPA to fully consider UWAG's "preferred alternative" approach to address AEI.

UWAG's approach as well as the work from EPRI better describes a system for defining aquatic health through fish population studies. Accordingly, we fully endorse the concept of determining fish and aquatic health and vitality based upon fish population - rather than on the possible arbitrary determination of AEI with the impingement or entertainment of one fish.

EPA Response

Please see response to comment 316bNFR.069.008.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William Sarbello

On Behalf Of:

Self

Author ID Number:

316bNFR.073

Comment ID 316bNFR.073.001

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name William Sarbello

Organization Self

Issue 1. General Comment: While this rule is generally good, it does not go far enough in setting National Minimum Standards for 316(b). (Draft rule § 125.80(c), p. 49115.)

Recommendation 1. I will recommend strengthening language for this important National rule, to apply to all states, territories, tribes, and interstate authorities, in order to protect inter-jurisdictional stocks of fish, shellfish, and wildlife from unnecessary, avoidable mortality.

Discussion 1. This rule affects migratory stocks of fish, shellfish, and wildlife, and stocks in border waters whose movements cross political boundaries. It is not enough that an individual state may adopt stronger rules for itself; EPA must set strong standards that apply to all 500+ jurisdictions. While my state may have stronger standards than other states, that does not protect "our" striped bass (or summer flounder, rainbow smelt, turtles, or blue crabs) from getting killed in the waters of other states having less stringent standards. Only EPA rulemaking can make an adequate level of protection the "law of the land."

Also, having strong, uniform standards Nationwide would preclude corporations from fleeing to the state or political subdivision with the weakest rules. With cross-border electric power sales happening every hour, cross-border migration of fish stocks must not result in greater numbers of entrainment mortalities. Unless EPA establishes rigorous national standards, states with stricter standards will suffer economically for their efforts, and the effectiveness of their measures will be undercut by cross-border polluters bound by less rigorous standards.

EPA Response

EPA believes the two-track technology-based approach published today does establish consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities, while also providing flexibility to address site-specific concerns. States will be required to meet these requirements at a minimum. Under the CWA if States do not establish requirements equivalent to (or more stringent than) the national requirements set forth today EPA can withdraw approval of their NPDES program and EPA will administer the program. EPA believes that this consistent, national regulation will resolve the interjurisdictional issues.

Comment ID 316bNFR.073.002

Author Name William Sarbello

Organization Self

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

Issue 2: 25% exclusion, Who is covered under this proposed rule? (Sup. Inf. P. 49066, V.A..; draft rule § 125.83 "Cooling Water Intake Structure ", p. 49116)

Recommendation 2: Eliminate this exclusion or, at the very least, make it a very small percentage, like "less than 1%." If limited to the choices offered by EPA on p. 49067
paragraph 4, I would choose the smallest, 5%.

Discussion 2: There are two issues here, a) a 25% exclusion is unreasonably large, and
b) screening technology that reduces/eliminates mortality should be applied to any intake.

a) Under this exclusion, intakes drawing 8 MGD or more (up to 2 MGD cooling water comprising 25% or less of total intake volume) would not be required to take any mitigative. In the Hudson River at Athens (a tidal river under the proposed definition), an 8 MGD intake volume would be expected to kill annually (for the life of the facility) 3,549,107 alewife+blueback herring, 46,690 American shad, 44,442 white perch, 2,366 striped bass, and numerous other fish that were not characterized. (Extrapolations based on volumes from Commissioner's Interim Decision, Athens Generating Company, LP, SPDES No.: NY-0261009, June 2, 2000, p. 13, footnote 10.) Such levels of mortality are unacceptable, as they could be readily minimized by a variety of means, and would not constitute applications of the best technology available.

b) If any portion of the water is used for cooling the whole intake should be mitigated, at least through simple screening techniques, to reduce impingement and entrainment impacts. For example, the 8 MGD intake cited above could be readily mitigated by adding a 2 mm wedgewire screen designed to provide a through-slot velocity of less than 0.5 fps under conditions of 25% screen fouling, and be equipped with an air blast cleaning system and pressure differential sensor to detect fouling and initiate automatic cleaning. Such a screen configuration is a standard design, and would greatly reduce entrainment or impingement mortalities from both the process water and cooling water intake cycles.

I note that on p. 490067, second paragraph, that it was EPA's intention "...to ensure that almost all cooling water withdrawn from the waters of the U.S. are addressed by the requirements of this proposal for minimizing adverse environmental impact. " I believe lowering the threshold as I have suggested will best accomplish EPA's stated objective.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-

generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

In response to the commenters suggestion that technologies be used on cooling water intake structures, EPA agrees. EPA has established a two-track regulatory approach that allows facilities to propose technologies that meet specific impingement and entrainment reduction requirements.

Comment ID 316bNFR.073.003

Author Name William Sarbello

Organization Self

Subject Matter Code 7.4

Water Withdrawal threshold

Issue 3: 2 MGD Exclusion. Only cooling water intakes drawing more than 2 MGD are subject to this rule. (Draft rule § 125.81, p. 49116; Sup. Inf. V. A. p 49066.)

Recommendation 3: Lower this exclusion to 1 MGD. I reject the alternate thresholds of 5, 10, 20, 25, and 30 MGD as resulting in fish mortalities beyond acceptable levels.

Discussion 3: It is easier to mitigate the impacts of the small water withdrawals. I note that with the EPA-suggested 25% rule, even a 1 MGD cooling water intake could be part of a 4 MGD intake that would not be subject to today's rule. Such an intake would still kill millions of fish over the life of the intake. (See Discussion 2, and divide the numbers per species in half) However, combining my proposed 1 MGD exclusion with my Recommendation 2 would still provide an exclusion for small cooling water withdrawals, while assuring full mitigation of more significant ones.

The consequences of EPA's proposed higher thresholds, at new plants, which have ultimate flexibility to employ the best technology would be unacceptable mortalities. For example, the 30 MGD threshold proposed, if applied at the Athens Generating Station, would needlessly kill:
13,309,150 river herring (alewife+blueback herring)
175,086 American shad
166,657 white perch, and
8,871 striped bass,

each year, every year, for the life of the facility (probably at least 40 years). This is 175 times more impact than what My home state certified as Best technology Available for such a facility. I note that this 1,080 MW facility has been permitted and will be built without the excessively permissive conditions that EPA 's 30 MGD exemption would have permitted.

EPA is concerned that a 25 MGD threshold would relieve 35% of the chemical industry from complying with the rule. However, the impact of the unmitigated intake upon the biological integrity of the waters is just as harmful whether the water is going to a chemical plant or an electric power plant. The fish killed are the property of the People of the State, not EPA and not the industry. I oppose EPA causing additional impacts upon the People's public trust resources in order to give a "break" to a specific industry. I favor a level-playing field where all industries are required maintain the biological, chemical, and physical integrity of U.S. waters. Therefore, I recommend that EPA select a 1 MGD threshold.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this

threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.073.004

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name William Sarbello

Organization Self

Issue 4: Definition of "Cooling Water Intake Structure" (Draft rule § 125.83, p. 49116; Sup. Inf. V. C. p 49066.)

Recommendation 4: This definition is insufficient; it should be modified to say, The entire physical structure and mechanism used for withdrawing and conveying water, from the waters of the U.S. to the heat exchanger, plus structures and discharges associated with its maintenance and operation. The cooling water intake structure shall include, but not be limited to, any associated constructed waterway, pipe, fissure, or other conveyance, porous dikes, fabric filters, barrier nets, all associated screens, perforated plates, fish return systems, trash buckets, fish troughs, fish return pipes (sluices, canals, etc.), pressure washes, backflushing mechanisms, air sparging mechanisms, pumps, manifolds, cleaning mechanisms, bar racks, trash conveyors, screen enclosures, traveling screen mechanisms and controllers, and any conveyance for passing discharge water to a point upstream from a heat exchanger.

Discussion 4: EPA's proposed definition excludes the most essential part of a water intake, the pumps, and does not include many important features for reducing aquatic organism mortality. This is especially critical, as this definition will doubtlessly apply to existing cooling water intake structures as well as new cooling water intake structures.

The pumps are the most critical part of the cooling water intake, regulating cooling water capacity, and should not be excluded. First, there would be no "intake" of water without the operation of pumps to withdraw water from the source water body, so to exclude them is unreasonable and illogical. Second, as a component of the cooling water intake, they are a major source of mortality for entrained aquatic organisms. For example, when the cooling water system is operated WITHOUT THE DISCHARGE OF HEAT, mechanical forces result in the mortality of virtually 100% of entrained bay anchovies are killed, and nearly 100% of entrained alewife and blueback herring. Studies done at the Connecticut Yankee nuclear power station (CT), and similar studies done in plants on the Hudson River (NY) that indicate this.

Indeed, one important method of mitigating once-through cooling system impacts is to reduce the quantity of water withdrawn by shutting off some of the pumps, or installing and operating variable-speed pumps. Not including the pumps as part of the cooling water intake excludes from regulation one of the most important tools for avoiding or minimizing the impacts and is unacceptable.

Further, EPA's proposed definition excludes key parts of what I consider cooling water intake structures, and parts that have a great influence on reducing impingement/entrainment mortality. I recommend including those structures explicitly. My proposal would include in-waterbody structures through which intake cooling water flows, like barrier nets and "gunderbooms." It would also include fish return systems, which are crucial to the survival of impinged organism, and the mitigation of intake structure impacts. Controlling the location, design, construction, capacity, and operation of low- and high-pressure screen washes, fish troughs on traveling screens, the pipes and sluices through which

fish are returned, and the specialized low-impact pumps (helical or Archimedes screw-type) for returning the fish with minimum injuries should also be regulated as part of this rule.

Also, common devices that kill fish at intakes should be regulated under this rule, such as trash conveyors like the "aquaguard" which re-handle and re-injure. Fish survival can be improved by careful attention to the smoothness of pipe surfaces, their size, the radius of turns, and the velocity of flows.

EPA Response

The final rule defines "cooling water intake structure" to mean the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. The final rule also clarifies that the cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. EPA agrees that these pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed.

EPA disagrees that the definition excludes key parts of the cooling water intake structure. The definition includes any constructed waterway used to withdraw cooling water. EPA has defined the term broadly to allow for inclusion of up-front fish protection technologies such as barrier nets -- such technologies are part of the total physical structure of the intake. The requirements that require minimization of impingement mortality and entrainment are the mechanisms by which EPA has addressed survivability of organisms and minimization of adverse impact.

Comment ID 316bNFR.073.005

Subject Matter Code	7.42
Request for Comment: Higher Threshold for Smaller Withdrawal Percentages	

Author Name William Sarbello

Organization Self

Issue 5: EPA is considering adding language to preclude cooling water withdrawals that exceed 1% of the mean annual flow or volume of the water body. The language is proposed on p. 49068 paragraph 8, and would be inserted at the end of § 125.81.

Recommendation 5: I support this 1% limit; if anything it is quite generous. I suggest considering 0.1 % or 0. 05%. EPA's higher suggested levels, which go up to 20%, are unreasonably excessive. I believe a percentage limit, whatever it is, makes more sense than adding an absolute minimum flow threshold to avoid overwhelming smaller water bodies.

Discussion 5: I made approximate calculations for a tidal estuary in New York City (the East River) in the vicinity of a proposed new power plant at Astoria. The 1% flow calculation yielded a flow limitation of 924 MGD for that site, which is a very large quantity of water. This is much more water than is needed for the proposed NYPA Astoria facility (1.4 to 6.1 MGD for a closed-cycle-cooled, mechanical-draft evaporative tower, 500 MWe combined-cycle facility). Indeed, the 924 MGD representing 1% of the flow was adequate to supply the needs of 50 out of 56 steam-electric facilities in New York State with state NPDES permits. (For example, the once-through-cooled 1,200 MWe Bowline 1 & 2 Station is permitted for a maximum 912 MGD, the dry-condenser cooled 1,080 MWe Athens station is permitted at 0.18 MGD.)

In this example a 0.1% limitation would be 92.4 MGD, 0.05% would be 18.5 MGD.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

No percentage flow threshold has been added to the applicability provisions. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities, as one of several requirements. For further discussion of these points, see Section VI.A.3, VI.C, and VI.D of the preamble to the final rule.

Comment ID 316bNFR.073.006

Author Name William Sarbello

Organization Self

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

Issue 6: Should BTA requirements or conditions be inserted into a general stormwater NPDES permit, or should a site-specific NPDES stormwater permit be required? (p. 49068 Sup. Inf. V. E., second paragraph.)

Recommendation 6: I support that an individual NPDES stormwater permit should be required.

Discussion 6: An individual permit would be simpler, and would also permit mitigating other impacts, such as those relating to a Clean Water Act Section 404 permit or Section 401 water quality certificate.

EPA Response

In the event that a new facility's only NPDES permit is a general permit for storm water, EPA anticipates that the Director will write an individual NPDES permit containing requirements for the facility's cooling water intake structure. Such 316(b) requirements, however, could also be included in the general permit.

Comment ID 316bNFR.073.007

Author Name William Sarbello

Organization Self

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

Issue 7: Regulation of cooling water intakes upstream of a new facility that supply the new facility with water.

Recommendation 7: For other industrial facilities, the upstream facility should be required to meet the new source performance standards, no matter how small the percentage of flow for the new facility. For municipal water supply utilities that serve a larger community, the "more-than-one-half" rule suggested by EPA seems reasonable.

Discussion 7: Industrial facilities, must avoid using an existing facility to preclude compliance with new facility performance standards. I support EPA' s interpretation that this is analogous to their General Counsel Opinion No. 43 (6/11/76). In New York State one facility requested authorization to use the existing intake of a once-through-cooling electric power plant as the intake for a new electric power plant, and, alternatively, the discharge of the once-through power plant as the intake to the new power plant.

I have required a separate and distinct intake for the new power plant. If the effluent of the existing power plant was to be used as input water to the new power plant, I would require that the intake of the existing power plant should meet new-plant standards.

For municipal water supply intakes, I propose not requiring new cooling water intake standards. Under most circumstances, the municipal intake will be mitigated under the terms of the state water supply permit and other laws. I support EPA' s proposal that, if more than 50% of the municipal water supply utility is used to provide cooling water, it should comply with 316(b) standards. This would prevent the ruse of creating a municipal water supply district for the primary purpose of supplying industrial cooling water.

EPA Response

See response to comment 316bNFR.036.003.

Comment ID 316bNFR.073.008

Subject Matter Code	7.52
Request for Comment: Indirect Dischargers	

Author Name William Sarbello
Organization Self

Issue 8: Proposal not to regulate facilities that discharge to a publicly-owned treatment works (POTW).

Recommendation 8: I believe that this is reasonable only for facilities that draw water from a municipal water supply utility, as regulated in Issue 7. I do not believe it is reasonable for cooling water intakes where cooling water is taken directly from the waters of the U.S., nor where water is taken from a second facility that withdraws water from the waters of the U.S.

Discussion 8: When water is taken from a municipal water supply utility and discharged to a POTW I agree that limits imposed by both public facilities will limit the quantity of water involved. My experience is that facilities that qualify are either small closed-cycle evaporative cooling electric power plants, electric power plants serving as a steam host to industry or supplying a municipal steam systems, and sometimes employ dry condenser cooling.

However, facilities taking cooling water directly from waters of the U.S. or from a secondary facility that withdraws cooling water from waters of the U.S. should be subject to the new facility performance standards. One example is the S.A. Carlson facility in Jamestown, NY. While not a new facility, it was withdrawing cooling water from a small stream (Chadakoin River), and returning discharges to the stream at temperatures in excess of 100° F. After mitigation, the facility (which still withdrew cooling water from waters of the U.S.) installed closed-cycle cooling, greatly reduced its intake flow, and sent its blowdown to the municipal POTW. This is a reasonable arrangement, but it would not be if the improved intake and closed-cycle cooling were not required.

As stated previously, setting up an intermediate company to withdraw the water should not excuse an intake system from meeting new facility performance standards; the impacts are the same no matter which company is doing the withdrawing.

EPA Response

EPA agrees that setting up an intermediate company to withdraw the water should not excuse an intake system from meeting today's final rule requirements. To that end, EPA included specific language in 40 CFR 125.81(b) so that new facilities may not circumvent the implementation of today's requirements by creating arrangements to receive cooling water from an entity that is not itself a point source. Finally, EPA has included language in today's final rule which will exempt those new facilities from today's requirements if they obtain cooling water from a public water system.

The final rule applies to new facilities that are point source dischargers, not indirect dischargers (i.e., facilities that discharge to POTWs). This is in keeping with the language of section 316(b), which refers to standards "applicable to a point source." However, section I.D. of the preamble specifies that the rule applies to any new facility, as defined in section 125.83, that has an NPDES permit, or is

required to obtain one because they discharge or might discharge pollutants, including storm water, from a point source to waters of the U.S. Many facilities that discharge to POTWs might also engage in such discharges, and thus be subject to the rule.

Comment ID 316bNFR.073.009

Subject Matter Code	9.41
Current Agency Interpretation of AEI	

Author Name William Sarbello

Organization Self

Issue 9: Environmental impacts associated with Cooling Water Intake Structure (p. 49071-49074, Supp. Info. Sections A, B, and C only.

Recommendation 9: The text is good, but omits (and should add) a critical, additional discussion focusing on limits to the volume if intake waters.

Such a section should discuss the following considerations for weighing environmental impacts:

1. The negative environmental impacts of cooling water intake structures killing susceptible aquatic life increase in direct proportion to increases in the volume of water used (capacity).

2. Once-through cooling typically uses 100 timesmore water, and has 100 times the impact on aquatic life, than evaporative closed-cycle cooling, a readily-available pollution control measure.

3. Once-through cooling uses more than 2,200 times more water, and has more than 2,200 times the impact on aquatic life, than dry condenser cooling, another readily-available pollution control measure.

4. Unlike closed-cycle recalculating cooling systems (which treat the pollutant heat and minimize the discharge of this pollutant to the waters of the U.S.), once-through cooling systems take in vast quantities of waters for the sole purpose of dilution instead of treatment, of the pollutant heat.

5. Given the direction of regulation and the ability to incorporate existing mitigative technologies, once-through cooling at new facilities should be considered inconsistent with the goals of the Clean Water Act at 33 USC 1251(a)(1) and (6), pollution discharge elimination procedures at 33 USC 1314(c), and the standard of performance definition under 33 USC 1316(a)(1).

Discussion 9: To elaborate on the recommendation, Heat is explicitly listed as a named "pollutant" in the definitions at 33 USC 1362(6). More specifically, 150° F heat, the temperature of steam in a power plant condenser, meets the definition of "toxic pollutant" at 33 USC 1362(13), as it would kill and/or injure organisms.

Closed-cycle recirculating cooling systems treat the pollutant and minimize the discharge to waters of the U.S. The volume of water they use, and hence the capacity of their cooling water intake, is 100 to 2,200 times less than once-through cooling, with 100 to 2,200 times less impact on the propagation and survival of aquatic life in the waters of the U. S.

Once-through cooling systems simply dilute the pollutant before discharge, a practice that is permitted for no other pollutant. Even for transient pollutants like BOD or dissolved chlorine gas, treatment is required to reduce or remove the pollutant, and mere dilution is never permitted as an in-plant "process." (That is, digestion or de-chlorination would typically be required, respectively.) But for once-through cooling systems associated with a thermal discharge, dilution instead of treatment has been

permitted, with huge effects on aquatic life. It is the taking of this huge volume of dilution water that is responsible for the very large capacity requirements of once-through cooling water intake; which in turn results in injury to or death of many billions of organisms every year.

These avoidable impacts, and this relationship of volume:mortality/morbidity, need to be added to this section.

EPA Response

EPA agrees with the commenter that losses attributable to cooling water intakes are proportional to cooling water withdrawals. Today's technology-based rule seeks to minimize entrainment and impingement losses by reducing intake flows to levels commensurate with that which can be attained by a closed-cycle recirculating cooling water system.

EPA also agrees that facilities using once-through cooling can take in large volumes of cooling water, resulting in substantial entrainment and impingement impacts (see section III of today's preamble). For that reason, EPA is requiring reduction in intake flows to levels commensurate with that which can be attained by a closed-cycle recirculating cooling water system. Further, EPA is requiring additional design and construction technologies to be implemented to minimize impingement and entrainment of all life stages of fish and shellfish and to maximize survival of impinged life stages of fish and shellfish.

EPA's record demonstrates flow reduction from once-through to recirculating wet cooling towers of approximately 93 to 96 percent. The reduction of flow from once-through to dry cooling is approximately 99.8 percent. Thus, the incremental difference between dry and wet cooling towers is approximately 3 to 7 percent. Regardless, EPA agrees with the concept presented by the commenter that flow reduction will mean reduction in adverse environmental impact.

Finally, EPA understands that both 316(a) and 316(b) issues are part of an NPDES permit consideration, they serve different purposes, and they are two separate provisions of the CWA that must be addressed independently. Although EPA recognizes that a permitting authority must consider and address both provisions and balance today's requirements with the thermal discharge requirement of the new facility in a cohesive, implementable permit, today's final rule focuses on location, design, construction, and capacity of cooling water intake structures that must reflect best technology available for minimizing adverse environmental impact and not on thermal discharges as addressed in section 316(a) of the CWA and the implications of that variance provision on the dilution of heat as a pollutant.

Comment ID 316bNFR.073.010

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name William Sarbello
Organization Self

Issue 10: Permitting once-through cooling for new facilities.

Recommendation 10: Once-through cooling systems should not be permitted for any waters of the U.S. unless an affirmative showing is made that the location, design, construction, and capacity of such system minimizes adverse environmental impacts to the same or greater extent than dry condenser cooling with the most effective screening, such as "Gunderboom."

Discussion 10: I believe that the low impingement/entrainment mortality levels that dry condenser cooling serves as the starting point Best Technology Available assessment for all competing technologies at new facilities, including evaporative and once-through cooling. I believe alternate technologies which meet or exceed the dry cooling level could be approved as BTA.

It is potentially possible that a once-through cooling system could meet such a standard. For example, a once-through system that used processed sewage for cooling might kill no fish, wildlife, or shellfish and consume less energy than closed-cycle cooling options. If it additionally met all water quality standards for the discharge it could potentially meet my proposed "alternative technology exemption" - demonstrating that it minimized adverse environmental impacts to the same or greater extent than would have been achieved by dry condenser cooling.

A Gunderboom marine life exclusion system is another potential alternative technology that might meet the standard. Studies would have to show that it did not impinge, injure, or kill eggs, larvae or fish from its through-fabric water velocity, and that seals and seams effectively prevented organisms from passing around the boom.. My experience indicates that the gunderboom would have to be sized large enough so that the target through-fabric velocity was 0.01 ft/sec to protect the eggs and larvae of striped bass. This is a 50 times lower velocity than EPA's proposed limit of 0.5 ft/sec. The applicant would have to demonstrate that injury and mortality to organisms was less than or equal to that expected from a dry cooling system to meet the "alternative technology exemption. "

EPA Response

While EPA has taken a technology-based approach to the new facility rule, EPA views recirculating closed-cycle wet cooling as the standard of comparison rather than dry cooling. EPA has rejected dry cooling as best technology available for the reasons described in Section V.C of the preamble to the final rule. EPA considers that there are plausible situations where developing technologies such as the Gunderboom system, combined with changes in location, design, construction, and, potentially, capacity that lead to comparable reductions in impingement and entrainment for the Track II option. See Chapter 5 of the Technical Development Document.

The two examples presented by the commenter describing processed sewage cooling water use and the Gunderboom system, though limited in description and hypothetical in this context, would potentially

meet the requirements of Track II of the final rule. However, as pointed out in the preceding paragraph, EPA views the standard of comparison for entrainment and impingement reduction to be closed-cycle recirculating wet cooling and not dry cooling as presented by the commenter.

The comprehensive demonstration requirements for Track II are discussed in Section VII.B-3 of the preamble to the final rule.

Comment ID 316bNFR.073.011

Author Name William Sarbello

Organization Self

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Issue 11: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 1of 10) - Discussion of problems under 1977 316(b) draft guidance. (p. 49074, Supp. Info. VII. D., paragraphs 1 and 2)

Recommendation 11: I concur with EPA's assessment in paragraphs 1 & 2 of Supp. Info. VII. D., p. 49074. and recommends as a solution New York's approach outlined as the "second alternative" toward the end of Page 49704

Discussion 11: While the 1977 guidance had a good definition that "[a]dverse aquatic environmental impacts occur whenever there would be entrainment or impingement damage as a result of the operation of a specific cooling water intake structure," it errs by not requiring that adverse environmental impacts be minimized.

EPA Response

Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.073.012

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name William Sarbello

Organization Self

Issue 12. What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 2of 10) - EPA is not proposing language today defining adverse environmental impact, but may do so in the final rule (p. 49074, Supp. Info. VII. D. paragraphs 3 and 4)

Recommendation 12: The regulation must define this phrase, it is critical for understanding and implementing 316(b). I propose that EPA adopt the following definitions:

* Adverse environmental impact shall mean any harmful, unfavorable, detrimental or injurious effect on individual organisms of fish, wildlife or shellfish or their eggs or larvae; or the water, land, or air resources of the U.S., its states, territories, or possessions; or on human health, welfare, or safety; or on the human enjoyment of those resources.

* Minimize shall mean to reduce to the smallest possible amount, extent, size, or degree.

*Minimize adverse environmental impact shall mean to reduce to the smallest possible amount, extent, size, or degree the adverse environmental impacts in the following order of priority:

*First: To comply with federal environmental laws and fish and wildlife laws, especially the Clean Water Act and Clean Air Act, and the rules, regulations, standards, criteria, orders, classifications, limitations, certifications, antidegradation policies, etc. there under. In addition for delegated Section 402 or 404 programs, all applicable environmental and fish and wildlife laws, rules, regulations, standards, criteria, orders, classifications, limitations, certifications, antidegradation policies, etc. of the state or other political subdivision to which the delegation has been made.

*Second: To take any additional measures necessary to restore the chemical, physical, and biological integrity of the waters of the U.S., in order to comply with the policies of 33 USC 1251, and in the case of a delegated permit program, any similar, no less protective policy contained in the laws of such delegated state or other political subdivision.

*Third: Among any remaining adverse environmental impacts, as determined pursuant to the National Environmental Policy Act or applicable equivalent state environmental impact assessment law, to avoid and minimize those impacts to the extent practicable, consistent with social, economic and other considerations.

Discussion 12: I believe that not having a simple, clear definition of "adverse environmental impact" hinders the advancement of the goals of the Clean Water Act. I continue to stress that EPA's emphasis should be placed on minimizing adverse environmental impact through the many, readily available pollution control techniques. Attempting to set higher thresholds for "adverse" will perpetuate debates over measurement and interpretation while fish mortalities continue without sufficient mitigation efforts. Instead the emphasis should be on avoidance and minimization.

EPA Response

EPA is largely in agreement with the definitions proposed by the commenter. Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.073.013

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name William Sarbello

Organization Self

Issue 13: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 3of 10) - EPA's "potential alternative 1" Entraining 1% or more of the aquatic organisms in the near-field area in a l-year study would constitute an adverse environmental impact. (p. 49074, Supp. Info. VII. D. paragraphs 5 and 6.)

Recommendation 13: As proposed, I believe this approach is not consistent with the water-quality-based quality programs within EPA, the Endangered Species Act, nor state fish and wildlife laws. Those EPA's water-quality-based programs specifically assure that all commercial, recreational, and socially important species (like endangered/threatened species) are 100% protected, and protect 99% of all other species. "Potential alternative 1" does not. Under "potential alternative 1" there would be no determination of "adverse environmental impact" even if all endangered species were killed, as long as the grand total of organisms killed was less than 1% of the sum of near-field organisms comprised of all species. I recommend EPA drop this alternative as violating state and federal laws and the Clean Water Act antidegradation policy

Discussion 13: While attractive at first glance, this approach has many substantial and, I think, fatal problems. "Potential alternative 1" seeks to protect 99% of the organisms, whereas EPA's guidance in water quality-based programs is to protect 99% of the species, plus all socially, recreationally, and commercially important species. This is very different, and "Potential alternative 1" is far less protective than what I believe the law requires.

First, "potential alternative 1" treats all organisms the same regardless of species, so a rapidly-reproducing Daphnia sp. accorded the same weight as an endangered sea turtle or a young striped bass for the purpose of counting 1% of the near-field organisms. This is insufficiently sensitive. Further, it is clearly inconsistent with EPA's guidance for setting action levels in water quality-based programs. Typically in such programs the species are arrayed by sensitivity, from most sensitive to least. The first cut-off line is set to protect 99% of the species. However, if any socially, commercially, or recreationally-important species lie within that 1%, the cut-off line is moved to assure the protection of such important species. This may result in protecting 99.999% of the species to properly implement the guidance. "Potential alternative 1" has no such provision and does not look at species. If it did, it would find in most situations that a great many socially, commercially, or recreationally-important species are susceptible and are indeed being killed by impingement/entrainment in the near-field.

Second, a l-year study, which will doubtlessly involve sampling and sampling bias, might not be sufficiently accurate to portray all the species and the variability of their numbers to be encountered over the 50-year life of the facility associated with the cooling water intake.

A third difficulty is defining the extent of the near-field area, especially in dynamic systems like tidal rivers.

A fourth difficulty is that rather than minimizing adverse impact, this approach would permit the unnecessary killing of endangered, threatened, commercially important, and recreationally important game and protected species. These species are a public trust resource, and usually protected by State and federal fish and wildlife laws. Rather than minimize mortality to the lowest levels, EPA is essentially establishing an entitlement for cooling water intake operators to kill these protected species in violation of state and federal laws. Besides the usual important fish species in my home state we have had canvasback and redhead ducks killed in power plant intakes, EPA sites endangered sea turtles in Florida, and I know seals have been killed by drowning when entrained in the water intake tunnel of the Seabrook plant in New Hampshire.

Fifth, some states have species-specific water quality standards, such as salmon propagation or anadromous fish passage. Permitting avoidable mortality to occur would appear to violate such a water quality standard. Even where a higher attained use is not designated, any impairment could be a violation of the antidegradation policy.

I feel this approach is erroneous, and in some circumstances may be unlawful, and I urge EPA not to promulgate it.

EPA Response

EPA agrees with many of the concerns expressed by the commenter. At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study;" however, this approach was rejected for the purposes of today's rule in favor of a more technology-based approach that seeks to minimize impingement and entrainment using appropriate technologies. Please see response to comment 316bNFR.029.031 and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.073.014

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name William Sarbello

Organization Self

Issue 14: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 4 of 10) - EPA's "Potential Alternative 2" - Impingement and entrainment would constitute an adverse environmental impact, however EPA would develop additional guidance to define when the magnitude is great enough to be deemed adverse. (p. 49074, Supp. Info. VII. D. paragraphs 8.)

Recommendation 14: This approach is still problematic and inconsistent with the requirements of technology-based standards, new source performance standards, and antidegradation policy of the Clean Water Act. Rather than simply striving to minimize adverse impact, some degree of reasonably avoidable mortality would be O.K., although impingement and entrainment are adverse environmental impacts they are at the same time not adverse environmental impact. This is "Catch-22" logic, and I urge EPA to instead select "Potential Alternative 3."

Discussion 14: I am very concerned that EPA to is taking what should be a simple concept and turning it into an unlawful, arcane, and unworkable regulatory schemes. Many of the proposed alternatives are inconsistent with the technology-based standards of Sections 301, 304, and 306 of the Clean Water Act (33 USC 1311, 1314, 1316).

It is fundamental to the Clean Water Act that technology-based limitations are to protect the best uses of the water. Water-quality based limitations are to correct problems where the best uses are yet to be attained. Sections 301 and 304 drive the use of better and better technology to reduce pollution. Section 306 mandates technology for new facilities, which have the most flexibility to incorporate new, better, technology at an efficient cost. Section 302 provides for more stringent standards when, despite these measures, water quality standards and designated uses are still not attained. Section 303 provides further back-up through setting Total Maximum Daily Loads and Antidegradation protection measures. EPA's rulemaking must comply with and implement these principles.

Instead, many of the alternate approaches offered by EPA in the "Supplementary Information" take the reverse approach, and avoid implementing any technology-based limits until after aquatic life/wildlife uses are violated. This is inconsistent with the law and contrary to EPA's own antidegradation guidance. Therefore, I subscribe to the approach EPA refers to as "a third alternative" on the last paragraph on page 49074, and I commend that approach to EPA. I strongly urge EPA to consider my general and technical comments carefully, and again offer my proposed, plain-English definition "adverse impact" for EPA's consideration

See also Recommendation 11 and Discussion 11.

EPA Response

Please see responses to comments 316bNFR.029.013 (AEI interpretation), 316bNFR.022.004 (AEI measurement) and section VI.B.2 of the preamble to today's rule. Today's technology-based rule

seeks to minimize impingement and entrainment impacts using a two-track framework. Under Track I of today's rule, all intakes will be subject to the technology-based performance standards that minimize entrainment and impingement. Should a facility choose to follow Track II of today's rule, they can show that site-specific conditions and/or applied technologies will allow them to achieve a level of reduction in impingement and entrainment comparable to the level achieved under Track I. Thus, today's rule provides flexibility while ensuring that all applicants reduce impingement mortality and entrainment to the levels achievable by meeting the technology-based performance requirements of Track I.

Comment ID 316bNFR.073.015

Author Name William Sarbello

Organization Self

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Issue 15: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 5of 10) - EPA's "Potential Alternative 3" - "Adverse environmental impact" defined as "any impingement or entrainment of aquatic organisms" similar to the State of New York approach. (p. 49074, Supp. Info. VII. D. paragraphs 9.)

Recommendation 15: I wholeheartedly support this approach. After 25 years of experience implementing the delegated NPDES program under a water quality standard that parallels 316(b), my home state's natural resource agency has found this approach works. I commend to EPA the draft language I provided in Recommendation 12.

Discussion 15: I feel this approach is most consistent with the purposes of the Clean Water Act with protecting species under federal and state Endangered Species Acts, and minimizing mortality on protected public trust fish and wildlife resources. I do not believe that any of the other potential alternatives identified by EPA meet the responsibilities under these laws.

EPA Response

Please see responses to comments 316bNFR.022.004 and 316bNFR.029.013.

Comment ID 316bNFR.073.016

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name William Sarbello

Organization Self

Issue 16: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 6 of 10) - EPA's "Potential Alternative 4" - Defines adverse environmental impact in relation to reference site similar to biocriteria like the "Index of Biological Integrity."

Recommendation 16: As I mentioned in my submission to the 316(b) workshops, I believe this approach is unworkable because 1) There are no pristine, un-impacted sites to serve as a baseline, and 2) rather than avoiding the impacts in the first instance, the project would operate, kill organisms, and only then measure what was lost against a reference site, if such existed.

Discussion 16: Most cooling water intakes and associated power generation or industry are located near other population and industrial centers where the environment has been altered by human activity and pollution for decades, if not centuries. For example, most estuaries like the Hudson River have been altered by centuries of environmental injuries.. Other similar estuaries have been similarly impacted from domestic and industrial pollution, dredging, upland erosion, interception of fish passage by dams, loss of littoral habitat by bulkheading and fill, loss of wetland systems, alteration of flow by river regulating reservoirs and hydropower dams upstream, legal and illegal harvest, municipal water supply withdrawals and out-of-basin transfers, toxic sediments, introduced exotic species, and the cumulative impact of decades of multiple, very large cooling water intakes. What could one possibly use as a "base case" for a pristine version of the Hudson River for an Index of Biological Integrity (IBI)? How could an agency apportion observed changes to decide what was caused by cooling water IBI withdrawals, and what was caused by any of the many other simultaneous anthropogenic and natural impacts?

There is a role for sharing data from one site to close-by sites on the same water body as an indicator of species abundance and as a predictor of potential species impingement/entrainment for proposed facilities. But this must be done very cautiously, as nearby sites may have very different physical characteristics that can affect the composition of the biological community. Without more details I am very skeptical that an IBI-type approach would not work, or at best could only measure what was lost by not employing the Best Technology Available in the first instance.

EPA Response

EPA agrees with the commenter. Please see response to comment 316bNFR.056.031.

Comment ID 316bNFR.073.017

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name William Sarbello

Organization Self

Issue 17: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 7 of 10) - "Potential Alternative 5" EPA requests comment on a definition of adverse environmental impact that would focus on (1) the protection of threatened, endangered, or otherwise listed species; (2) protection of socially, recreationally, and commercially important species; and (3) protection of community integrity, including structure and function.

Recommendation 1:. This alternative would fail to implement appropriate goals and policies under the Clean Water Act. If EPA continues to pursue this policy it will continue to foster what it says it wants to end:

"The initial determination of environmental impact has often relied on population modeling, which given its inherent complexity, has yielded ambiguous or debatable results. One result has been that many section 316(b) permitting decisions have predominantly focused on determining whether a cooling water intake structure is causing an adverse environmental impact. Given that both the methods for making such determinations and the standard regarding what constitutes an "adverse " environmental impact were not precisely defined, permitting authorities have had to exercise significant judgment and focus significant time and effort to determine what requirements should be imposed under section 316(b)." (p. 49074, emphasis added.)

Rather than creating a common-sense definition of "adverse," or issuing meaningful national standards, this alternative would be continuing "ANALYSIS PARALYSIS." Such studies will always yield debatable results in the short term, it would be more reasonable and cost effective for dischargers to invest in preventing or minimizing impacts. See my discussion for an elaboration.

I recommend that EPA accept the definitions I have offered in Issue 12 of these comments, minimize the impacts, and effectively administer the public resource, consistent with its duties under sections 316(b), 304(c) and 306 of the Clean Water Act (33 USC 1326(b), 1314(c), and 1316).

Discussion 17: In New York's Hudson River, regulated dischargers, conservation groups, an endowed research foundation, and the State have spent millions of dollars and more than 25 years trying to characterize a subset of the issues EPA would require for determining whether or not the impacts would constitute "adverse impact " The state agency, regulated parties, and citizen conservation groups still disagree on the interpretation, despite probably the best data set on the planet, full agreement on sampling design, data collection, certain analysis techniques, and many aspects of modeling. This alternative would repeat this impossible "ANALYSIS PARALYSIS" approach for every NEW thermal discharger, instead of requiring pollution control equipment be installed before the plant is built.

(The work sited has been carried out under the Hudson River Settlement of 1981 for the State PDES permit for Bowline, Roseton, and Indian Point generating stations, which created. among other things, cooperative in-river and at-plant monitoring of aquatic organisms, and created the independent Hudson

River Foundation to carry out river research.)

EPA Response

EPA agrees that it can be difficult and costly to accurately assess population level effects in many cases and has documented some of the weaknesses and uncertainties associated with evaluating fish populations (see section VI.B.2.c of today's preamble). Today's rule, and Track I in particular, focuses on use of best technology available to minimize any AEI (see response to comment 316bNFR802.001).

Please see response to comment 316bNFR.029.013 and preamble section VI.B.2.a for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.073.018

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name William Sarbello

Organization Self

Issue 18: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 8 of 10) - "Potential Alternative 6" - The EPA may consider definitions to be submitted by the Utility Water Action Group measures for assessing when adverse impact is occurring by water body type. (p. 49075, paragraph 3).

Recommendation 18: Section 303 of the Clean Water Act (33 USC 1313) Congress gives the States, EPA, interstate agencies, territories, and tribes the authority to adopt water quality standards after due process. States and other qualifying jurisdictions have the prime responsibility for classifying waters according to their best use, setting standards to maintain their biological, chemical, and physical integrity to meet those designated uses, and to implement anti degradation policies to protect higher attained uses. Industry groups have not been given authority to participate in this regulatory process.

Discussion 18: I appreciate that this might be a good-will gesture; however, industry-driven waterbody classifications are likely to be overly self-serving, resulting in inconsistent use designations, and unacceptable alteration of the antidegradation policy.

In New York State, classes "E" (industrial use) and "F" (sewage conveyance) were eliminated in 1967, so that all perennial waters must support fish propagation and survival. I also call to EPA's attention that New York State has just added 152 miles of the Hudson River to its 305(b) Priority Water Bodies list as "impaired" for "aquatic life propagation" due to the cumulative impacts of multiple once-through cooling water intakes of thermal dischargers. This is based on 24 years of data quantifying the impact of these cooling water intakes in reducing the September 1 young-of-year population of several important species of fish.

The UWAG proposal is troublesome, and I request that a with a copy under the Freedom of Information Act.

EPA Response

UWAG submitted their own specific definition of AEI (published in the NODA) which EPA took into consideration for the purposes of today's rule. Please see response to comment 316bNFR.069.008.

Comment ID 316bNFR.073.019

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name William Sarbello

Organization Self

Issue 19: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 9 of 10) "Potential Alternative 7" - Should EPA define adverse environmental impact more broadly and consider non-aquatic adverse environmental impacts as well? (p. 49075, paragraph 4).

Recommendation 19: See my suggested definitions at Recommendation 12 (Comment 316bNFR.073.012). Yes, adverse environmental impact is broader. However, a panoply of environmental laws and regulations already exist to address these impacts. These laws and regulations have already balanced public need, public health and welfare, risk, costs to the public and the regulated parties, etc. EPA should simply require compliance with these laws and regulations. A "wholly disproportionate cost" test could be employed, but only after there has been compliance with the standards of all applicable laws. In my experience to date is that the loss in efficiency is not wholly disproportionate to the benefits of reduced flows and concomitant reduction in impact; for new plants the loss in efficiency averages between 0.5 to 2% for a 100- to 2,000 times reduction in water consumption and impact.

Discussion 19. Adding a pollution control device to an industrial process will almost invariably cause some decrease in process efficiency and internalization of costs versus externalizing costs of environmental impacts.

The pollution control devices that reduce cooling water intake volume, and reduce the mortality of aquatic life probably cause some decreases in efficiency and increases in cost to the discharger versus unfettered operation, but that is completely consistent with the concept of "polluter pays." Our mutual concern should not be with maximizing the profit for the discharger, but assuring that all environmental and fish and wildlife laws are met.

Using evaporative closed cycle cooling reduces the volume of water used (capacity) by a thermal discharger, and proportionally the aquatic impacts, by about 100 times, compared to once-through cooling, dry evaporative closed-cycle cooling with about 2,200 times reduction in capacity and impact. A recent application for a new combined-cycle power plant in New York City (Keyspan Ravenswood 250 MW) compared the loss of electric production for 2 forms of closed-cycle cooling against a once-through cooling base-case. The loss in efficiency was less than l% for plume-abated mechanical draft evaporative cooling towers under all conditions for a l00-times reduction in impact. (%MW reduction compared to once-through vs. air temp. in °F: 0.76%, 90°; 0.68%, 55° [annual average temp]; and 0.64%, 20°,) The numbers for a 2,200 times reduction in water volume and impact with dry cooling is 3.9%, 90°; 1.2%, 55°, and 1.0%, 20°. A couple of percent cost to meet environmental standards is a relatively marginal expense, which should not determine whether or not a project should be permitted or built.

EPA Response

EPA agrees with recommendation 19, but not for the reasons as stated in discussion 19. Contrary to the commenter's statements, EPA does not view the concept of the "polluter pays," even though the final rule imposes financial burden on the regulated firms. The final rule is economically practicable, which means that the rule is affordable to the regulated entities. This is analogous to technology-based rules under section 301 (BAT) and 306 (NSPS) of the act.

EPA notes that the data quoted for efficiency loss estimates and flow reduction factors differs from the Agency's well researched and documented analyses. See the Chapter 3 of the Technical Development Document for energy penalty estimates and response to comment 316bNFR.206.012 for discussion of the flow reduction factors for closed-cycle cooling technologies and their relative reductions in aquatic impacts.

Comment ID 316bNFR.073.020

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name William Sarbello
Organization Self

Issue 20: What Constitutes Adverse Environmental Impact Under This Proposed Rule (Part 10 of 10) "Potential Alternative 8"- EPA is taking comments on whether to alter the 316(b) standard of "best technology available" to conform with the 316(a) of "balanced indigenous population" standard.

Recommendation 20: Such a shift would weaken public policy, and would result in environmental damage and “analysis paralysis" instead of preventing the pollution in the first place. It may also be contrary to the intent of the Clean Water Act and case law. EPA should impose reasonable nationwide pollution. I am concerned that such a change would be inconsistent with Clean Water Act antidegradation requirements and guidance in the EPA Water Quality Standards Handbook.

Discussion 20: My home state has evidence that many once-through cooling water intake structures impair fish propagation. To gather the detailed information that follows took 24 years and millions of dollars of monitoring, research, and analysis. Each new cooling water intake structure should not have to repeat the mistakes of the past.

Here are the statistics for the 152-miles of Hudson River from the southern tip of Manhattan to the head of tide at the Federal dam at Troy, NY. The figures indicate the percentage reduction in the September 1 young-of-year population due to the mortality caused by the cumulative impact of the major once-through cooling intakes; the lower end of the range makes certain assumptions about through-facility survival of entrained organisms, the high end of the range assumes 100% mortality. The years presented are those with the highest reduction for that species of the 24 years of data:

* 25- 79% reduction in spottail shiner (1977)
* 27-63% reduction in striped bass (1986)
* 52-65% reduction in American shad (1992)
* 44-53% reduction in Atlantic tomcod (1985)
* 39-45% reduction in alewife and blueback herring combined (1992)
* 30-44% reduction for white perch (1983), and
* 33% reduction for bay anchovy (1990)

This conditional mortality rate data shows population in an unbalanced state compared to the native or "indigenous" state without cumulative cooling water withdrawal impacts. However, it is fair to predict that industry representatives are ready and willing to argue that this does not indicate an unbalanced population.

This alternative would create more opportunities for endless delay and debate. EPA should adopt the plain language presented by My in Recommendation 12, and should prevent pollution nationally through good standards for all new intakes. Employing the 316(a) standard for 316(b) would amount to backsliding.

I am concerned that a change from "Best Technology Available to minimize adverse impact" to

"balanced indigenous population" would be inconsistent with Clean Water Act antidegradation requirements and guidance in the EPA Water Quality Standards Handbook. Antidegradation requires protecting designated uses and higher attained uses. In particular, the guidance for "Aquatic Life/Wildlife Uses" states:

"Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. Any lowering of water quality below this full level of protection is not allowed" (Emphasis added, Water quality standards handbook: second edition. EPA-823-B-94-005a, page 4-5. USEPA 1994.)

However, this proposed change would lower the water quality standard from "minimization" to permitting large levels of mortality, which seems inconsistent with antidegradation. I note that 316(a) applies to a discretionary variance that should not become a universal mandatory requirement that supercedes the plain language of 316(b).

EPA Response

Please see response to comment 316bNFR.026.013.

It is precisely due to the commenter's concerns about "analysis paralysis" that EPA has chosen to focus the Track I requirements on reducing impingement and entrainment, allowing expedited permitting decisions for new facilities.

Comment ID 316bNFR.073.021

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name William Sarbello

Organization Self

Issue 21: Proposed Section 316(b) New Facility Regulatory Framework (1 of 5) - Grouping water bodies into 4 categories. (p. 49076 paragraph 2 through p. 49178 paragraph 1)

Recommendation 21: I support EPA's identification and grouping of water bodies into 4 categories for purposes of assigning protection requirements pertinent to each. However, I strongly disagree with the sub-categorization based on littoral zone (See Recommendation 24). The definition for "lake" should be broadened to include "pond," which is similar to a lake but has no wave-swept beach free of vegetation. The "pond" classification should be included with the "lake" and "reservoir" categories, so it would read, "lake, reservoir, or pond."

Discussion 21: The categories seem reasonable, with the addition noted.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. The concept of subcategorization based on the littoral zone is also removed. EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types.

EPA considers the current definition of lake to be broad enough to include pond as the definition states “any inland body of open water with some minimum surface area free of rooted vegetation and with an average hydraulic retention time of more than 7 days”.

Comment ID 316bNFR.073.022

Subject Matter Code 10.01

Regulatory Framework Options

Author Name William Sarbello

Organization Self

Issue 22: Proposed Section 316(b) New Facility Regulatory Framework (2 of 5) Capacity requirements, (p. 49077 to 49078)

Recommendation 22: I support EPA's proposed capacity requirements. I strongly support the river and stream limitation of "no more than the more stringent of 5% of the source water mean annual flow or 25% of the source water 7Q10" and would recommend adding this important concept to the regulatory framework. The lake-reservoir-pond requirement is essential to preserving the ecology of ponded waters, and agree that the "[t]otal design intake flow must not upset the natural stratification of the source water." (EPA might consider whether the phrase should read, ...natural thermal stratification....) And, while new, I think the proposed estuary-tidal river requirement is logical, and I support it.

Discussion 22: Good work!

EPA Response

EPA appreciates the commenters' support, however, note that the final requirement for cooling water intake structures located in a freshwater river or stream removed the option of "or 25% of the source water 7Q10." It now reads "for cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow." The phraseology for cooling water intake structures in a lake or reservoir did change to "the total design intake flow must not disrupt the natural thermal stratification..."

Comment ID 316bNFR.073.023

Author Name William Sarbello

Organization Self

Subject Matter Code 13.1

Requirement of 0.5 fps

Issue 23: Proposed Section 316(b) New Facility Regulatory Framework (3 of 5)- Maximum intake velocity cap of 0.5 feet per second (fps) (p. 49077 to 49078).

Recommendation 23: I strongly support this maximum velocity limitation as a means of reducing fish mortality. However, to be effective it should be coupled with an exclusionary screen. Unless fish are physically excluded, or have a barrier that they can perceive and swim away from, they will be entrained even at these low velocities. I therefore strongly urge that screening be made part of this requirement.

Discussion 23: Without a physical barrier, fish will not perceive any danger, and will be entrained into the plant. I have found that some fish, fully capable of swimming out against the intake velocity, often do not do so. I do have at least one existing electric generating plant in my home state that uses no intake screens (Milliken Station, Lansing, NY). They periodically reverse flows through their condensers in order to backflush out all the dead fish that accumulate and clog their condenser tubes.

I have studies to show this velocity works effectively with 2 mm-spaced wedgewire-type screen. This velocity may be too high for finer-mesh screens, which will impinge fish eggs and larvae. And for gunderboom-type barriers, 0.05 fps is the maximum velocity that does not impinge eggs. I anticipate that, for finer screens, lower velocities could be imposed as a condition under §125.84(f) and (g).

EPA Response

EPA agrees with the commenter with respect to maximum intake velocity. Given the compilation of supporting data presented in this rulemaking, EPA, in the final rule, has retained the Track I intake velocity requirement of 0.5 ft/s through-screen velocity which the Agency proposed.

See response to comment 316bNFR.001.001 for information on the intake configuration.

See response to comment 316bNFR.206.116 for information on avoidance behaviors of fish at intakes.

Comment ID 316bNFR.073.024

Subject Matter Code	10.03
Additional Littoral Zone Requirements	

Author Name William Sarbello

Organization Self

Issue 24: Proposed Section 316(b) New Facility Regulatory Framework (4 of 5) - Differing degrees of protection for intakes within the littoral zone, outside the littoral zone, and within 50 meters of the littoral zone (p. 49077 to 49078).

Recommendation 24: I strongly support the measures EPA has proposed for intakes within the littoral zone and in estuaries and tidal rivers as a good national standard of performance.

However, I strongly feel that the level of protection suggested for littoral zones should be applied to non-littoral zones as well. I am concerned that the lesser degree of protection is inconsistent with applicable antidegradation requirements for protecting aquatic life and wildlife uses. I urge EPA to drop the lesser degrees of protection for non-littoral areas and have the stronger standards apply, irrespective of light intensity.

Discussion 24: The littoral zone approach is problematic. First, life in the deep water areas is no less valuable, less important, or any less a public trust resource than that found in shallower littoral waters. It should be afforded the same degree of protection.

Second, these deep waters are critical habitats for many important species and no less worthy of full protection. For example, in the deep, oligotrophic Finger Lakes of New York these areas are the home of the mysid shrimp, Mysis relicta, an important food for the lake trout, rainbow smelt, and alewives, found at that depth because of the low light levels.

In marine waters, deep waters these are the areas where juvenile winter flounder have been entrained by offshore dredging projects. These are areas of important surf clam beds, and both the food for these clams and the spawn of the clams would be subject to entrainment by cooling water intakes. They are also important feeding areas for endangered sea turtles, and a variety of finfish and zooplankton spawn at depth in these areas. Also, these are areas where many species migrate parallel to the shoreline.

Third, fewer requirements could result in new power plants and other thermal dischargers preferentially selecting these site, concentrating their impacts there. Instead, to avoid negative impacts, I recommend the same high level of protection for all sites.

Fourth, the littoral zone changes with time, and can be expected to change over the life of the facility. Efforts to clean up lakes have increased light penetration and the size of the littoral zone. I have seen secci disc readings in Lake Erie go from several inches in the 1960's, to more than 40 feet in the 1990's. Other effects have resulted in increased light penetration, such as acidification from acid rain, and increases in filter-feeding bivalve populations.

For this and other reasons I feel that the "zone of rooted aquatics" does not delimit the only area worthy of maximum protection, all areas should receive the degree of protection recommended for the

littoral areas.

I am concerned that the lesser degree of protection is inconsistent with applicable antidegradation requirements for protecting aquatic life and wildlife uses. EPA's "Water Quality Standards Handbook: Second Edition provides guidance for antidegradation that apply to "Aquatic Life/Wildlife Uses" (page 4-5) states:

"Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. Any lowering of water quality below this full level of protection is not allowed" (Emphasis added).

I believe this antidegradation requirement would apply to this current rulemaking effort. I interpret that the lesser protection proposed for non-littoral areas would not meet the antidegradation policy. I therefore urge EPA to afford the degree of protection afforded to the littoral zone, estuaries, and tidal rivers to all areas.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.073.025

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name William Sarbello

Organization Self

Issue 25: Proposed Section 316(b) New Facility Regulatory Framework (5 of 5) - General comment on approach (p. 49079, paragraph 1 through 3).

Recommendation 25: I strongly support nationwide application of the concept of minimum technology requirements for use in section 316(b) determinations, including the velocity cap, capacity requirements, screening requirements, plus additional requirements that may be imposed by the director.

I believe, however, that the level of protection required for the "littoral zone" should apply for the non-littoral zone in each of the 4 categories of waters in the proposed rule.

I also recommend an additional alternative that could permit once-through cooling under certain circumstances that may do a better job of avoiding and minimizing adverse environmental impacts and meet all applicable laws and water quality standards. I believe it will work better than the "non littoral zone" concept.

I recommend an exemption to permit alternate technologies which achieve the same degree of fish, wildlife, and shellfish protection as the new facility technology-based standard for Best Technology Available. Such an exception could be worded as follows:

Equivalent-performing alternate technology exception - An alternate technology that kills fewer aquatic organisms, meets all legal requirements, and minimizes adverse environmental impact [see definition offered in Recommendation 12] may, at the discretion of the Director, be substituted as equal to BTA.

Such an exception could permit once-through cooling from public treatment works wastewater, or from fishless waters, or potentially from very fine-pore filters with exceptionally low velocities, like gunderbooms or porous dikes, BUT only if they work as well or better than closed cycle cooling with all the additional requirements

With these strengthened provisions, I believe EPA has an outstanding approach that would simplify permitting, increase certainty, eliminate "analysis paralysis" from needlessly complex criteria, level the playing field nationally among states, and assure equal protection of migratory stocks that cross state lines.

I further believe this is a more efficient use of applicant and government agency resources. Money would be spent on pollution prevention, instead of lengthy, and often ambiguous studies, analysis, disagreement, debate and deliberation, while mortalities continue.

Discussion 25: None.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. The littoral zone delineation concept is removed and EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types.

The two-track approach does allow for use of alternative technologies. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

EPA agrees that the Track I approach has the advantage of fast-tracking permitting thus avoiding the transaction costs of the case-by-case approach.

Comment ID 316bNFR.073.026

Author Name William Sarbello

Organization Self

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Issue 26: Requiring dry cooling systems (p. 49080, paragraph 18 and following)

Recommendation 26: I support requiring dry condenser cooling as Best Technology Available for new facilities. I believe this would be a simple, effective standard that would minimize or eliminate discharge of pollutants, consistent with the goals of the Act in 33 USC 1251(a)(1), and would encourage locating facilities away from major water bodies. However, it would be folly to discourage alternate technologies that achieve mortalities of fish, shellfish, and wildlife as low, or lower than that achieved by a dry condenser cooling design. Therefore, I endorse such an exemption for alternate technologies that meet or exceed the same level of protection as dry condensers.

Discussion 26: See wording for alternate technology exemption in Discussion 25. In this case it would state that best technology available is dry condenser cooling, and alternatives that achieve the same level of protection as dry condenser cooling may be substituted as equal to BTA.

EPA Response

See response to comment 316bNFR.073.034.

Comment ID 316bNFR.073.027

Author Name William Sarbello

Organization Self

Subject Matter Code 10.13

Request for Comment: Uniform Set of Standards Applicable to All Facilities

Issue 27: Comments sought on requiring the BTA requirements EPA has proposed for estuaries and tidal rivers to apply to all facilities, regardless of their location. (Page 49082, second paragraph.)

Recommendation 27: NYSDSEC strongly endorses this alternative for numerous reasons, including that it is the only one that meets antidegradation and state fish, wildlife, and shellfish laws. Furthermore, EPA's economic data shows that the cost of additional protection is affordable with the total national annualized compliance cost of $16.4 million.

Discussion 2:. See Issue 24 Recommendations and Comments.

EPA Response

See response to 316bNFR.008.010. The two-track approach in the final rule provides flexibility for new facilities to address site-specific factors while ensuring a level of performance based on best technology available to minimize adverse environmental impact. EPA agrees that the provisions of the rule are available and economically practicable.

Comment ID 316bNFR.073.028

Author Name William Sarbello

Organization Self

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

Issue 28: Comments sought on alternate regulatory approach with 3 tiers of risk analysis and about 22 decision points before applying technology-based limits to the new facility (page 49082, 4th paragraph.)

Recommendation 28: I am very concerned that EPA to is taking what should be a simple concept and turning it into an unlawful, arcane, and unworkable regulatory schemes. Many of the proposed alternatives are inconsistent with the technology-based standards of Sections 301,304, and 306 of the Clean Water Act (33 USC 1311,1314, 1316).

It is fundamental to the Clean Water Act that technology-based limitations are to protect the best uses of the water. Water-quality based limitations are to correct problems where the best uses are yet to be attained. Sections 301 and 304 drive the use of better and better technology to reduce pollution. Section 306 mandates technology for new facilities, which have the most flexibility to incorporate new, better, technology at an efficient cost. Section 302 provides for more stringent standards when, despite these measures, water quality standards and designated uses are still not attained. Section 303 provides further back-up through setting Total Maximum Daily Loads and Antidegradation protection measures. EPA's rulemaking must comply with and implement these principles.

Instead, many of the alternate approaches offered by EPA in the "Supplementary Information" take the reverse approach, and avoid implementing any technology-based limits until after aquatic life/wildlife uses are violated. This is inconsistent with the law and contrary to EPA's own antidegradation guidance. Therefore, I subscribe to the approach EPA refers to as "a third alternative" on the last paragraph on page 49074, and I commend that approach to EPA. I strongly urge EPA to consider my general and technical comments carefully, and again offer my proposed, plain-English definition "adverse impact" for EPA's consideration.

In addition this alternative is extremely information-hungry, and at each decision point there could be arguments about data collection, results, and interpretation. I strongly oppose this alternative.

Discussion 28: See Issues, Comments, and Recommendations 12 through 20.

EPA Response

In terms of the substantive provisions of this rule, EPA believes this rule is entirely consistent with sections 301, 304, an 306 of the CWA. See response to 316bNFR.206.007; 316bNFR.068.007; 316bNFR.068.008 and the preamble to the final rule.

Also, EPA notes that the same industry commenters have argued that section 303 and 301(b)(1)(c) may not be applied to intake because section 301(b)(1)(c) relates to effluent limitations. Although EPA believes States can always be more stringent than EPA, EPA does not necessarily view that all

States have water quality standards that address CWIS. Thus, this regulation may serve as the only control of CWIS.

Comment ID 316bNFR.073.029

Author Name William Sarbello

Organization Self

Subject Matter Code 10.15

Suggested Alternative: Optional Studies for Site-specific Best Technology Available

Issue 29: Comments are sought on "state of the art studies and predictions" involving multiple decision points and 7 levels of analysis for multiple species, including cost-benefit analyses. (Page 49083, 2nd paragraph)

Recommendation 29: I strongly oppose this alternative, same recommendation and discussion as Issue 28. Additionally this alternative would violate state's rights and state fish and wildlife laws regarding killing of protected animals. I oppose the cost-benefit analysis proposed. It externalizes the costs to the public in killing public trust fish, wildlife, and shellfish resources (which are not the property of the intake operator) as the "cost," weighing it against the monetary savings of not installing pollution control technology, benefits that would accrue only to the intake operator. I object to this type of "public bears the costs for benefits to private polluters" as contrary to the principle of "polluter pays." I do not believe EPA has any right to allocate State public trust resources to be killed in this manner, especially when the means to minimize the mortality is readily available, and strongly recommend against this alternative.

Discussion 29: Same as Issue 28.

EPA Response

EPA has not adopted a purely site-specific that requires complex studies and cost-benefit assessments. The final rule adopts a two-track technology-based approach that does not weigh costs and benefits. Instead it balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. Hence, the final rule puts in place uniform national technology-base performance requirements using either a fast-track or demonstration track approach.

Track I specifies intake flow, velocity and source water-based flow requirements, as well as, where specified conditions exist, a requirement for the permit applicant to select and implement those design and construction technologies that are most effective in minimizing impingement mortality of fish and shellfish and entrainment of entrainable life stages of fish and shellfish. Under Track I, new facilities that withdraw greater than 2 MGD and less than 10 MGD are not subject to the intake flow requirements but must comply with velocity requirements, source water-based flow requirements, and must select and implement design and construction technologies that minimize impingement mortality in specified circumstances, and that minimize entrainment of entrainable life stages of fish and shellfish in all cases.

Under Track II, a new facility can use any technology to demonstrate that it has reduced the level of adverse environmental impact to a level of performance comparable to that which would be achieved had the facility implemented the intake flow and velocity requirements in Track I. In addition, new

facilities are subject to the same source water-based flow requirements required in Track I and the same conditional design and construction requirements that apply to large facilities under Track I. Under both tracks, the rule provides that a facility may be subject to requirements the Director deems necessary to comply with any provision of State law, including compliance with applicable State water quality standards. The final rule also allows a new facility to request alternative requirements when compliance would result in costs that are wholly out of proportion to those considered by EPA in establishing the requirement at issue.

Comment ID 316bNFR.073.030

Subject Matter Code 10.04

Site-specific Permit Flexibility

Author Name William Sarbello

Organization Self

Issue 30: Comments are sought the suggestion on site-specific assessments as Issues 28 and 29 would not delay permitting or impose undue burden on state or federal permit writers (page 49083, 5th paragraph.)

Recommendation 30: My experience living in a state that has administered the state NPDES program since 1975 indicates that, on the contrary, this is a tremendous burden on program, staff, and state trust natural resources. EPA should instead implement the technology-based-standards approach required by the Clean Water Act. See issues, comments, and discussions 28, 12-20, and 29.

Discussion 30: See Discussion 20 for some of the impacts my home state has found in the Hudson River. After 24 years of data collection the results are still argued by the regulated parties, and New York has 152 miles of irreplaceable estuary impaired for fish propagation and survival.

EPA Response

EPA agrees with the commenter that wholly site specific assessments do impose higher burdens and have the potential to cause delays in permitting. Therefore, EPA has adopted a minimum national technology based standard approach, with a two-track Option. This is designed to be a more straight-forward implementation than other options, avoiding an "unworkable regulatory scheme", while still providing some flexibility to take into account site-specific conditions.

The two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the “fast track” (Track I), or by demonstrating the same level of performance as the Track I requirements under the “demonstration track” (Track II). Facilities also have the flexibility to propose the technologies which they believe will be the most effective in meeting the requirements.

Under Track I, the capacity of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system and the design through-screen intake velocity is restricted to 0.5 ft/s. The rule also includes requirements that restrict the total quantity of intake in proportion to the mean annual flow of a freshwater river or stream, or the natural thermal stratification or turnover patterns of a lake or reservoir, or to a percentage of the tidal excursions of a tidal river or estuary. In addition, the applicant must select and implement an appropriate design and construction technology for minimizing entrainment and impingement and maximizing impingement survival. Under Track II, the applicant has the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements for capacity, design velocity, and design and construction when applied to a shoreline intake at the new facility site. Proportional flow requirements also apply under Track II.

Comment ID 316bNFR.073.031

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name William Sarbello
Organization Self

Issue 31: Pages 49089-49091. "6. What is the role of restoration measures? ...Mandatory ...Discretionary ...Voluntary...."

Recommendation 31: I strongly support the mandatory restoration approach as described in 6.a., which mitigates only for the adverse environmental impact that would remain after applying all other techniques for mitigating the location, design, construction, and capacity of the intake structure.

I do not support the voluntary restoration approaches listed in 6.c., where questionable mitigation may be substituted for technology-based water quality standards. Such mitigation is almost always an inadequate replacement of the species, functions, and values lost, and is inconsistent with the purposes and goals of the Clean Water Act, as explained previously.

For discretionary mitigation as described in 6.b. there is inadequate detail for us to decide its value or liability.

Discussion 31:

The staff of my State' s natural resources agency usually address environmental impacts in the following hierarchy:

1) Avoid a negative impact to the extent practicable.
2) For those negative impacts that can't be avoided, minimize them to the extent practicable.
3) For the residual negative impact that can't be avoided or minimized, seek compensation, (replacement of function) in the following order of ranking:
   a) In-kind, on-site or as close to it as possible (same watershed).
   b) In-kind, off-site.
   c) Out-of-kind, on-site or as close to it as possible (same watershed).
   d) Out-of-kind, off-site.

This hierarchy is similar to Federal policies, (e.g. USFWS) having the common root of the Council on Environmental Quality, which oversees NEPA implementation.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.073.032

Subject Matter Code 10.01

Regulatory Framework Options

Author Name William Sarbello

Organization Self

Furthermore, I object to the lesser degrees of protection because, if promulgated, they would infringe upon state's rights and state law. If EPA implements lesser standards in the non-littoral zone it would be "permitting" clearly avoidable fish mortality in violation of state fish and wildlife laws. These fish and wildlife resources belong to the respective States, and EPA has no authority to allocate the killing or taking of these animals contrary to appropriate State laws. Furthermore, EPA ' s economic data shows that the cost of additional protection is affordable with the total national annualized compliance cost of$16.4 million. <FN 2> Therefore, EPA should eliminate the lesser degrees of protection in order to correct this problem.

Footnotes

2 Proposed Rule page 49103 paragraph 2.

EPA Response

Please see response to comment 316NFR.073.021. States may always be more stringent than Federal requirements under Section 510 of the CWA.

Comment ID 316bNFR.073.033

Subject Matter Code MISC

Miscellaneous Comment

Author Name William Sarbello

Organization Self

It is fundamental to the Clean Water Act that technology-based limitations are to protect the best uses of the water. Water-quality based limitations are to correct problems where the best uses are yet to be attained. Sections 301 and 304 drive die use of better and better technology to reduce pollution. Section 306 mandates technology for new facilities, which have the most flexibility to incorporate new, better, technology at an efficient cost. Section 302 provides for more stringent standards when, despite these measures, water quality standards and designated uses are still not attained. Section 303 provides further back-up through setting Total Maximum Daily Loads and Antidegradation protection measures. EPA's rulemaking must comply with and implement these principles.

EPA Response

EPA finds that its interpretation of section 316(b) is consistent with the overall framework of the CWA.
See 316bNFR.068.007 and 068.008. Specifically, section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. Sections 301 and 306 of the CWA require that EPA develop technology-based effluent limitation guidelines and new source performance standards that are used as the basis for technology-based minimum discharge requirements in wastewater discharge permits. The final new facility rule establishes best technology available for minimizing adverse environmental impact associated with the intake of water from waters of the U.S. at these structures. The final rule recognizes that new facilities would have greater flexibility in designing and locating their cooling water intake structures at a lower compliance cost than existing facilities.

Comment ID 316bNFR.073.034

Author Name William Sarbello

Organization Self

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Fifth, I offer my comments on requiring dry condenser cooling as Best Technology Available for new facilities. I believe this would be a simple, effective standard that would minimize or eliminate discharge of pollutants, consistent with the goals of the Act in 33 USC 1251(a)(1), and would encourage locating facilities away from major water bodies. However, it would be folly to discourage alternate technologies which achieve mortalities of fish, shellfish, and wildlife as low, or lower than that achieved by a dry condenser cooling design. Therefore, I endorse such an exemption for alternate technologies that meet or exceed the same level of protection as dry condensers.

EPA Response

EPA agrees that implementation of dry condenser cooling based requirements would be simple, but disagrees that the technology is significantly more effective than other technologies such as the suite of technologies and compliance alternatives of the final rule. For the reasons discussed in Section V.C of the preamble to the final rule, EPA has rejected dry cooling as best technology available for new facilities.

EPA disagrees that this rule implementing section 316(b) should consider discharge of pollutants as a primary factor for a decision on the best technology for cooling water intakes. EPA recognizes that dry cooling technologies discharge very limited volumes of wastewater as a result of their operation. However, EPA notes that the effluent limitations guidelines and standards for the steam electric point source category currently apply to the discharge of pollutants from such technologies as those adopted for this final rule. As such, EPA determines that the regulations specifically designed to regulated pollutant discharges are more appropriate for the regulation of such effluents.

Regarding alternate technologies and Track II of this rule, see response to comment 316bNFR.073.010.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Chris Freiburger

On Behalf Of:

State of MI Dept. of Natural Resources,
Fisheries Division

Author ID Number:

316bNFR.074

Comment ID 316bNFR.074.001

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

Under Section V, C, the Environmental Protection Agency (EPA) invites comment on the proposed approach to defining a cooling water intake structure. The Department supports language, which modifies the definition of a cooling water intake. The definition adopted in the 1977 Draft Guidance does not adequately address facilities that use under fifty percent of the water drawn through the structure for cooling.

EPA Response

EPA agrees with the comment. In addition, EPA has placed the twenty-five (25) percent threshold in the applicability section of the final rule. Cooling water intake structures below this threshold are not subject to the final rule; however, permit writers should determine any appropriate section 316(b) requirements for structures withdrawing less than 25 percent of intake flows for cooling purposes on a case-by-case basis.

Comment ID 316bNFR.074.002

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Chris Freiburger

Organization State of MI Dept. of Natural Resources, Fisheries Division

The Department would further support that the definition should be changed so that facilities that use five percent or more of the water drawn through the structure for cooling water purposes be included. As noted in the proposed rules, this alternative would ensure that almost all cooling water is addressed in the requirements.

EPA Response

EPA has removed the twenty-five (25) percent threshold from the definition of a clean water intake structure and placed the threshold in the applicability section of the final rule. EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.074.003

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 7.3

Definition: Waters of the US

Section V, D invites comment on the applicability of the proposed rules to new facilities that withdrawal water from cooling ponds, which are, considered "waters of the U.S." The MDNR supports incorporation of cooling ponds into the new rules if they fit the definition of "waters of the U.S."

EPA Response

No response necessary.

Comment ID 316bNFR.074.004

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 7.4

Water Withdrawal threshold

The Department supports a threshold limit of two million gallons of water a day to ensure that almost all cooling water withdrawn from "waters of the U.S." are covered. For those facilities that do not withdraw two-MGD threshold, the MDNR supports a higher threshold of five percent based on waterbody flow.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.074.005

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Section VII, D seeks comment on the proposed definition of adverse environmental impact. The MDNR does not support the second alternative that uses the definition adopted in the 1977 Draft Guidance. However, the Department does support the third alternative, which is a similar approach taken by the State of New York that defines adverse environmental impact as any impingement or entrainment of aquatic organisms. This definition needs to be adopted so that Best Technology Available is installed. The State of Michigan has experienced considerable inaction in the adoption of technology because of disagreement among power producers and agency biologists if operation of the facility is causing adverse impact. The adoption of the new language would make the definition of adverse impact very clear and ultimately better protect the aquatic resource.

EPA Response

Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.074.006

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 10.0

Best Technology Available

In section VIII, A the MDNR supports the EPA setting technology oriented performance requirements and not mandating specific technology. Our support for this is due to the fact that each facility is site specific.

EPA Response

EPA agrees that certain aspects of each facility are site specific and, in the final rule, is establishing a two-track technology-based approach. EPA believes that the two-track approach serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.074.007

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 10.021

Request for Comment: Intake Velocity Limitation

The Department supports the proposed 0.5 feet per second through-screen velocity limitation.

EPA Response

EPA concurs with the commenter.

Comment ID 316bNFR.074.008

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 10.04

Site-specific Permit Flexibility

We also support that state agencies can take measures deemed appropriate to place further restrictions which may result in plant shutdowns during spawning or migration periods.

EPA Response

EPA interprets the CWA to authorize State and Tribal permit authorities to require more stringent limitations on intake where necessary to protect any provision of State law, including State water quality standards. This authority is described in Sections 125.80 (d) and 125.84 (d). Also, in Section 125.89 (2), permit renewal is discussed. At the time of permit renewal the Director may determine that additional requirements for design and construction technologies should be included.

Comment ID 316bNFR.074.009

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The MDNR supports the use of dry cooling particularly in sensitive areas, as might be the case of drowned river mouths, which enter the Great Lakes.

EPA Response

Although EPA has rejected dry cooling technology as a national requirement for the reasons described in Section V.C of the preamble to the final rule, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. Dry cooling technology would meet Track I requirements. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). The rule reflects that the CWA allows states to be more stringent and has so provided in the rule. 40 CFR 125.80(d)

Comment ID 316bNFR.074.010

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 11.2

Request for Comment: Considerations for Impacts Outside Littoral Zone

EPA is soliciting comment on location of intake structures from the outside of the littoral zone. For new facilities the Department supports providing the greatest protection available to the resources. Therefore, we support the distance criteria of 200 meters outside of the littoral zone not 50 meters as proposed by EPA. Additional language should be added that would give the resource agencies the authority to make modifications if this distance is not adequate and take into account site-specific attributes.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.074.011

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 10.011

River/Stream--Proposed Standards

EPA is seeking comment on flow requirements for new facilities with cooling water intake structures located in freshwater rivers and streams. The Department supports the EPA position to limit the total design intake flow from all cooling water intake structures at the facility to five percent of the annual mean flow of the waterbody. EPA estimates suggest that this should result in protection of greater than 99 percent of the aquatic community form impingement and entrainment.

EPA Response

EPA appreciates the support of the commenter.

Comment ID 316bNFR.074.012

Subject Matter Code	10.012
Lake/Reservoir--Proposed Standards	

Author Name Chris Freiburger

Organization State of MI Dept. of Natural Resources, Fisheries Division

The Department also supports EPA language that specifies that new facilities with cooling water intake structures in sensitive waterbodies might need more stringent requirements than those generally proposed here for lakes and reservoirs. The Department views the adoption of this language to be paramount. The proposed classification scheme does not provide for any greater protection of drowned river mouths that are biologically much more productive and sensitive than many lakes (i.e. Lake Michigan, Lake Erie).

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones.

To address concerns of highly sensitive waterbodies States may be more stringent under Section 510 of the CWA and require supplemental requirements under State law. Furthermore, to address specific types of sensitive waterbodies mentioned by the commenter the permit writer can impose additional requirements where necessary to minimize impacts (see Section 125.89(a)(2)).

Comment ID 316bNFR.074.013

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 14.3

Request for Comment: Consideration of Minimum Technology Requirements

Section VIII, D, 5 seeks comment on whether certain minimum technologies might be appropriate in virtually all circumstances and should be required in final section 316(b) regulations. Again, the Department supports providing technology at new facilities today to provide adequate protection instead of retrofitting facilities in the future.

EPA Response

Comment support rule. EPA agrees that it is important to require the appropriate technologies in this new facility rule because once the facility is built it would be far more costly to subsequently require retrofit at the facility.

Comment ID 316bNFR.074.014

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 15.1

Request for Comment: Role of Restoration

In Section VIII, D, 6 EPA solicits comment on the appropriate role of restoration under section 316. The Department staunchly supports language in the 316(b) that mandates restoration measures. The MDNR has had too many negative experiences of trying to partner with power producers to voluntarily institute restoration efforts unless they were mandated in License.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.074.015

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 15.12

Request for Comment: Restoration Plan Development and Implementation

The MDNR supports language in Section VIII, D, 6a that would require an effectiveness study to address impingement and entrainment and require a draft plan that addressed study results. This process would require review from a number of sources which would ultimately lead to a successful restoration plan.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.074.016

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 16.1

Discretionary Options Available to the Director

EPA seeks comment in Section VIII, D, 8 under which the Director would have broad discretionary authority to include permit conditions under section 316(b), in addition to the minimum requirements specified in "today's" proposal. The MDNR fully believes that the Director needs to have such authority. Each facility is unique in its relation to the local resource. The Director requires this authority to adequately protect resources in which they are most knowledgeable.

EPA Response

Although today's final rule provides tools to permitting authorities with which to protect aquatic organisms, state authorities have broad authorities under the CWA and state laws to continue to protect these aquatic organisms. Today's final rule and preamble recognizes that states may, under sections 401 and 510 of the CWA, ensure the inclusion of any more stringent requirements relating to the location, design, construction and capacity of a cooling water intake structure at a new facility that are necessary to ensure attainment of water quality standards, including designated uses, criteria and antidegradation requirements. For further discussions on these issues, see preamble section V.B.1.d.

Comment ID 316bNFR.074.017

Author Name	Chris Freiburger
Organization	State of MI Dept. of Natural Resources, Fisheries Division

Subject Matter Code 10.04

Site-specific Permit Flexibility

[T]he Department supports EPA in Section VIII, 8, C to evaluate costs and impacts on a national level. This is most appropriate for a proposed rule that establishes minimum section 316(b) requirements for a large number of new facilities.

EPA Response

Thank you for your comment. The EPA has evaluated costs and impacts on a national level as recommended in the comment. The final cost analysis is described in Section VIII of the Preamble, and details are reported in Chapters 6 and 7 of the Economic Analysis and in the Technical Development Document. The estimated annualized compliance costs are presented as a single cost to represent the highest potential implementation costs to industry.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William Nicholson

On Behalf Of:

Self

Author ID Number:

316bNFR.075

Comment ID 316bNFR.075.001

Author Name William Nicholson

Organization Self

Subject Matter Code 7.4

Water Withdrawal threshold

The historic background for Section 316(b) in the Clean Water Act was the concern that extremely large water intakes at large electric power generating plants caused death or injury to fish and other aquatic organisms. There seemed little concern about small water intakes. Thus, the focus of the EPA regulations related to Section 316(b) should be on extremely large intakes. These intakes are over 50 million gallons per day (50 MGD).

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD or higher, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 15 MGD, 32 percent of the manufacturers, 29 percent of the nonutilities, and 50 percent of the utilities would be covered, as would 97.3 percent of the total flow. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. While at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.075.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name William Nicholson

Organization Self

In the electric power generation area, it is critical that EPA differentiate between large electric power plants utilitizing full condensing technology and highly efficient cogeneration technology. Cogeneration, the sequential production of electricity and useful heat, is efficient because it does not discard energy in water-cooled condensing facilities. Because this technology is so efficient, there are much lower emissions of air pollutants, use of less fuel, and use of less water than in stand-alone electric power plants. These plants are much smaller than the typical stand alone electric power plant and their economics can be seriously damaged if forced to add a new water intake at facilities at which cogeneration is installed. The federal government has long favored development of cogeneration; the Public Utility Regulatory Policies Act has as well established a technical definition of cogeneration that those drafting regulation can use.

Given the above information, the EPA should assure that the Section 316(b) regulations do not disrupt the development of energy efficient, low emission cogeneration technology. The clearest way to assure this end is to exempt the installation of cogeneration technology from causing the requirements of the Section 316(b) regulations to be applied.

EPA Response

Please see response to 316bNFR.012.013.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Arthur D. Hershey

On Behalf Of:

Pennsylvania House of Representatives

Author ID Number:

316bNFR.076

Comment ID 316bNFR.076.001

Author Name Arthur D. Hershey

Organization Pennsylvania House of Representatives

Subject Matter Code 10.01

Regulatory Framework Options

As Chairman of the Pennsylvania House Environmental Resources and Energy Committee, I urge you to consider maintaining current procedures, rather than proceeding with proposed changes to EPA's Clean Water Act rule 316(b).

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.076.002

Author Name Arthur D. Hershey

Organization Pennsylvania House of Representatives

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

While I agree that safeguards must be in place for environmental protection, I submit that the preferred method for evaluating sites for electric plants with cooling towers should be on a site-by-site basis. Because of the various permitting processes already required, and the reviews conducted by numerous authorities, I am confident that any environmental impact mitigation technology appropriate for a particular site will be implemented.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.076.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Arthur D. Hershey

Organization Pennsylvania House of Representatives

Good science is a tool that should be used to achieve a balance between our desire to protect the environment, while allowing for the energy needs of our citizens to be met.

EPA Response

EPA agrees that good science should be used to achieve a balance between protecting the environment and achieving energy needs. EPA's final new facility rule is scientifically based, technically sound, protective of aquatic resources, and technically available and economically practicable and does not have
unacceptable non water quality environmental impacts (including energy impacts).

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Frank Rue

On Behalf Of:

Alaska Department of Fish and Game

Author ID Number:

316bNFR.077

Comment ID 316bNFR.077.001

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Limiting the scope of this proposed rule to projects that withdraw 2 MGD would leave many small cooling water diversions in Alaska unregulated. Each of these projects, without appropriate mitigation, would have adverse effects on fish. Under the proposed rule, to evaluate needs for fish screening, EPA must consider presence or absence of fish, maximum diversion rates, and proportions of water diverted from water bodies. Pursuant to Alaska Statute 16.05.840, ADF&G requires fish screening on all water diversions in water bodies frequented by salmon or other fish. Implementing fish screening is also much easier for small diversions than for large diversions. Thus, we recommend that all cooling water intakes be screened, regardless of capacity. This would also eliminate requirements to accurately predict water use and determine hydrologic parameters of a water body.

It will be difficult in many cases to manage and determine whether a project should be regulated under §316(b) based on the proposed rule of daily withdrawal thresholds or percent of water body flow. Regulators will encounter difficulty whether determining thresholds from water rights, operational records, or direct measurement. Regardless of rules adopted for regulation, any water measurement must be based on the maximum instantaneous diversion rate of flow, expressed in gallons per minute or cubic feet per second.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards. At the same time, a flow threshold provides some reasonable limit on the scope of the national requirements imposed under the rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ.

For further discussion of these points, see Sections VI, A, 3 and X, D.

Comment ID 316bNFR.077.002

Subject Matter Code	7.3

Definition: Waters of the US

Author Name Frank Rue

Organization Alaska Department of Fish and Game

We are also concerned that the legal definition of "waters of the U.S." may not cover all aquatic habitats where fish may be subject to impingement or entrainment by cooling water intakes. It is unclear whether water bodies such as ditches or canals connected to natural water bodies would be subject to the proposed role. Resident and anadromous fishes occupying these water bodies would be just as vulnerable to impingement/entrainment as fish in natural water bodies.

EPA Response

Section 125.83 of the final rule EPA defines "cooling water intake structure" to mean "the total physical structure and any associated constructed waterways used to withdraw water from waters of the U.S. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps." This definition addresses the use of ditches and canals
as part of a cooling water intake structure. If ditches and canals are not part of a cooling water intake structure, the permitting authority would determine under 40 CFR 122.2, on a case by case basis, whether they are jurisdictional waters of the United States subject to the rule. EPA notes that section 125.3 of the final rule recognizes that canals and channels can be part of a closed-cycle recirculating system.

Comment ID 316bNFR.077.003

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Frank Rue

Organization Alaska Department of Fish and Game

We support the proposed third alternative that defines adverse environmental impact as "any impingement or entrainment of aquatic organisms." Here we assume that juvenile fish are the focus when impingement or entrainment is discussed, rather than all "aquatic organisms," which would include phytoplankton, zooplankton, invertebrates, macropohytes, etc. In addition to impingement and entrainment, adverse environmental impacts to aquatic organisms can also occur as a result of depletion of instream flow and discharge of warm water effluent. An increase of a few degrees can greatly accelerate the development of fish eggs and larvae. Because rate of development of fishes in Arctic and sub-Arctic regions is genetically regulated to coincide with the availability of food, juvenile fishes that hatch and emerge from spawning gravel unseasonally will starve and die.

We do not support the first alternative that sets a threshold for adverse impact on the percentage of the organisms from an area. This definition of adverse environmental impact would require detailed baseline inventories that are very difficult to obtain and validate. Very little of the state has been surveyed and inventoried for biotic communities. Also, plant and animal populations and communities have great natural interannual variability. Levels of uncertainty in population studies are therefore usually high. Controlled experiments to determine percent injury/death of fish that come into contact with intakes are also difficult to conduct and depend on the availability of "test" fish to conduct control studies.

EPA Response

Please see response to comment 316bNFR.029.013 (EPA's interpretation of AEI).

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, this approach was rejected for the purposes of today's rule. Also please note that today's rule seeks to minimize entrainment and impingement of all life stages of fish and shellfish.

Comment ID 316bNFR.077.004

Subject Matter Code	11.13
Littoral Zone in Tidal Rivers/Estuaries	

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Location: We generally agree with EPA's assessment of areas that support the greatest numbers of aquatic organisms. The proposed rule specifies that the salinity of estuaries exceeds 0.5 parts per thousand (ppt) but less than 30 ppt and in oceans salinity is greater than 30 ppt. However, for coastal waters, such as the Inside Passage of Southeast Alaska, using a salinity criterion does not provide a clear distinction between where estuaries end and marine waters begin. Due to high freshwater runoff, salinities can be quite low in the top meter of the water column and greater than 30 ppt at depth.

EPA Response

This definition was developed using guidance from other EPA programs and existing literature sources. Thus the relevant definitions for the rule are as follows :

Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

Tidal river means the most seaward reach of a river or stream where the salinity is typically less than or equal to 0.5 parts per thousand (by mass) at a time of annual low flow and whose surface elevation responds to the effects of coastal lunar tides.

However, after reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has established a This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.077.005

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 11.3

Request for Comment: Fixed Distance from Shoreline Criteria

The proposed rule considers two alternative approaches to applying the most stringent minimum requirements: within a fixed distance from the shoreline and a fixed distance from the littoral zone. Because some littoral zones extend far from shore, it would be difficult to have a regulatory requirement based on a fixed distance from shore that would protect the majority of aquatic organisms at all locations. Depth, water clarity, water velocity and other factors generally determine the extent of the biologically functional littoral zone, not distance from shore. The suggested regulatory language on page 109 would be under-protective at some locations, over-protective at others, and generally difficult to apply.

EPA Response

Many commenters expressed concern over a specific area that would define the littoral zone. For this and other reasons, EPA has adopted an alternative regulatory structure in this rule and will not set nationally defined areas within waterbodies where different requirements apply for best technology available for minimizing adverse environmental impact. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.077.006

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 11.0

Best Technology Available-Location

In addition to the siting requirements proposed, EPA should not allow cooling water intakes where an impoundment structure (dam) would be necessary to operate an intake. Impoundment structures associated with water intakes create migratory barriers and other impacts (sedimentation, bedload interruption, thermal alteration, etc.), in addition to risks of impingement and entrainment for juvenile fish. Based on their location, some dams and diversions are particularly lethal to anadromous fish. In Anchorage, there is a cooling water intake project constructed in the intertidal zone. Salmon that pass through the ladder often die because they pass from salt water to fresh without an opportunity to adjust their osmoregulatory system.

EPA Response

Impacts from impoundment structures are more appropriately addressed under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

Comment ID 316bNFR.077.007

Subject Matter Code 12.1

Freshwater Streams/Rivers

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Flow and Volume: The proposed rule would require that total design intake flow from all cooling water intake structures at facilities located in freshwater rivers or streams be no more than the lower of five percent of source water body mean annual flow or 25 percent of the source water 7Q10. We agree that magnitude of entrainment impacts is directly related to capacity of intake flow. This is a conservative amount of water in water bodies with few diversions, but may not leave sufficient flow for all species/life stages in water bodies where much of the flow is already appropriated for consumptive use. The EPA must not only ensure that intake flow is not excessive, but also that sufficient instream flow is retained in rivers and streams to ensure that aquatic habitats, plant and animal communities, and species/life stages are not adversely affected. We recommend that EPA consider cumulative impacts of multiple diversions on amounts of water remaining in freshwater rivers or streams. Basing regulations on flow would also require sufficient hydrologic data for water bodies. Again, no flow data has been collected on most rivers and streams in Alaska. We recommend a minimum of 5 years of continuous pre-project stream flow and climatological data to determine basic hydrologic parameters.

EPA Response

EPA has opted not to include the 25% 7Q10 standard in today's final rule.

EPA agrees with the commenter that cumulative impacts must be considered when the overall goal is the protection of aquatic communities in the source water body. Any number of factors might need to be addressed to correctly assess cumulative impacts and adjust water use permits accordingly. This high degree of variability makes promulgation of a national standard problematic. EPA believes cumulative impacts are best addressed by the permitting authority on a case-by-case basis.

EPA acknowledges data instream flow data may not be available for every freshwater river or stream in the United States. The US Geological Survey currently maintains data collected from thousands of gauging stations located in the 50 States, the District of Columbia, Puerto Rico and US Virgin Islands. While this data does cover the vast majority of stream segments in the United States, some segments in remote or undeveloped areas may not be represented. This situation is largely particular to inland regions of Alaska, where historical data often does not stretch back the 10 years recommended in today's final, if any exists at all. In those situations, EPA encourages the facility to investigate other potential sources of instream flow information which may not be nationally available (state agencies, universities, other local businesses). When no instream flow data is available, the applicant should work in conjunction with the permitting authority to establish an appropriate capacity limitation.

Comment ID 316bNFR.077.008

Subject Matter Code 13.0

Best Technology Available-Velocity

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Velocity: ADF&G supports the criteria developed by the National Marine fisheries Service (NMFS) for salmonids, which are consistent with criteria developed by the Washington Department of fish and Wildlife and the Oregon Department of fish and Wildlife. Those criteria are based on salmonid fry swimming stamina measured at the University of Washington<FN 1> , field evaluations by the Pacific Northwest National Laboratory and the Bureau of Reclamation, and other studies and years of field experience by state and federal agency staff. State and federal criteria in California specify a slower approach velocity, 0.33 fps, compared to 0.4 fps for NMFS, Washington and Oregon for fish less than 60 mm. Thus, EPA's proposed 0.5 fps approach velocity criteria exceeds those established by West Coast state and federal fish and wildlife agencies. The criteria developed by West Coast fish and wildlife agencies have been applied at thousands of municipal, hydroelectric, and irrigation intakes. These criteria have also been specified and installed at a number of very large facilities on the West Coast (up to 3,000 cfs). We suggest that 0.5 fps is inconsistent biologically with needs of small juvenile salmonids as applied anywhere in the U.S.

Many important anadromous and resident fish species in Alaska, including whitefish, smelt, and eulachon, are broadcast spawners. On many rivers spawning runs of these species consist of millions of fish. Even with very low approach velocity and fine mesh, eggs of these populations will be drawn into cooling systems. Entrainment risk can also be a function of habitat use and seasonal migratory behavior. Intakes can attract resident fish seeking spawning, wintering, or hiding areas, and thereby create a potential for fish entrainment. Therefore, screening criteria may be relaxed or strengthened based on site specific information. Under the EPA's rebuttable presumption framework described in VIII.A.l (page 89) of the proposed rule, applicants who believe the proposed criteria are too stringent should have to conduct detailed fisheries surveys seasonally to determine the species, life stages, and size of fish that may be subject to entrainment.

NMFS-Northwest specifies an approach velocity criteria of 0.4 feet per second (fps) for fry-sized salmonids less than 60 mm and 0.8 fps for fish greater than 60 mm in length. In Alaska, the juveniles of several species of fish are smaller than those of salmon, char and trout. Therefore, we have developed the following table as a guide for fish screening.

Species/Life Stage	Screen Mesh<FN 2>	Approach Velocity<FN 3>
Whitefish (fry)	0.04 inches/1.0 mm	0.1 fps
Sheefish, Smelt, Whitefish (juvenile)	0.04 inches	0.4 fps
Pink, chum, coho, chinook and sockeye salmon; char and trout fry < 60mm<FN 4>	3/32 inches – woven wire & perforated plate; 1.75 mm (0.0689 inches) wedgewire/profile bar	0.2 fps (passive) <FN 5> 0.4 fps (active)
Pink, chum, coho, chinook and sockeye salmon; char and trout fingerling > 60mm	¼ inch – woven wire & perforated plate, wedgewore/profile bar	0.8 fps

We recommend that criteria established under the proposed rule be clearly written and very specific because terminology is often misconstrued. Approach velocity is defined as the component of the local water vector perpendicular to the face of the screen and is used to calculate minimum screen area. Minimum required screen area is calculated by dividing the maximum instantaneous diverted flow by the maximum allowable approach velocity. For existing screens, approach velocity is calculated based on the gross screen area (submerged, excluding area affected by structural components) not the net open area of the screen mesh. This calculation is much simpler than trying to calculate open area. In addition, to ensure low approach velocities, EPA's criteria must specify uniform flow distribution over screen surface and that sweeping velocities are greater than approach velocities.

Footnotes

1 Smith, Lynwood S. and Lilli T. Carpenter. 1987. Salmonid fry swimming stamina data for diversion screen criteria. Fisheries Research Institute, University of Washington, Seattle, prepared for the Washington Department of Fisheries and Washington Department of Wildlife.

2 Maximum allowable screen openings; i.e., diameter of circular perforations on perforated plate screen material.

3 Maximum approach velocity in feet per second (fps) is based on the swimming stamina of small fish under low temperature conditions and assumes that the screen face has no debris.

4 If biological justification cannot be provided to demonstrate the absence of fry-sized salmonids (less than 2.36 inches) in the vicinity of the screen, fry will be presumed present and fry criteria will apply for screen material.

5 Passive screens should only be used when the debris load is expected to be low, where sufficient sweeping velocity exists to eliminate debris build-up on the screen surface or the intake is located deep in a water body away from a shoreline.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.001.001 for information on the intake configuration.

EPA recognizes that approach velocity has been a measurement technique for intake velocity in the past. However, the final rule maintains the requirement to measure intake velocity on a design through-screen basis and has defined that velocity in the rule under § 125.83. See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

EPA concurs with the commenter with respect to entrainment of eggs at intakes. Eggs are incapable of escaping intake flows, regardless of intake velocity. However, the velocity requirement included in today's rule is not intended to address entrainment. The final rule includes capacity requirements that will limit the potential for entrainment. The intake velocity requirement is intended to minimize adverse environmental impacts due to impingement. As stated above, the Director may require additional controls to minimize entrainment impacts.

Comment ID 316bNFR.077.009

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 20.3

Head Loss Monitoring

Monitoring head loss across screens is appropriate in order to ensure that screen faces are clean and to protect facilities. However, EPA should also require active cleaning systems or oversized fish screens. NMFS's approach velocities are for screens that have cleaning systems. If facilities have no cleaning system (i.e., automated brush, back flush, water spray, or air burst) on intakes, screens must be oversized by two times (i.e., 0.2 fps) to provide for holes plugged with debris or ice. Continued periodic, regular screen evaluations also increase effectiveness of screen operation and maintenance practices by confirming adequacy of screen operating procedures at individual sites. Icing in the winter is a major problem for intakes in Alaska. Due to its adverse impact on fish, the application of hot water is not an adequate measure to prevent icing.

EPA Response

EPA believes it is important to optimize technologies to minimize impingement and entrainment. That is why EPA has required monitoring headloss at the cooling water intake structure and visual inspections of the fish protection technologies. However, EPA has concluded that it should not specify technologies that must be implemented to meet the requirement of the new facility rule. EPA determined that plant operators with better knowledge of site-specific conditions at the facility and in the source waterbody are in the best position to develop specific techniques for ensuring optimal operation of their systems.

Comment ID 316bNFR.077.010

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 10.0

Best Technology Available

In addition to setting approach velocities, we recommend that EPA also develop criteria for mesh size based on size of fish likely to be affected, type of mesh material, and other parameters.

EPA Response

The intent of the two-track technology-based approach established in today's rulemaking is to allow facilities to propose the most appropriate technologies for conditions specific to their site, including the type and size of fish present at a specific location. Establishing specific criteria for mesh size and type of mesh material would reduce the flexibility of the facility engineers to tailor technologies to specific site conditions. EPA notes that states may always be more stringent under section 510 of the CWA and require supplemental requirements under State law.

Comment ID 316bNFR.077.011

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 14.0

Best Technology Available-Additional Design and Construction Technologies

Additional Design and Construction Technologies: Utilization of positive- exclusion barrier screens at all intakes is appropriate for protection of downstream migrant salmon. However, primary motivation for selection of behavioral devices relates to cost. The EPA must develop a procedural approach to allow evaluation and installation of experimental behavioral guidance devices. We suggest that EPA develop a position similar to that of NMFS on experimental fish guidance devices (see http://www.nwr.noaa.gov/lhydrop/exp-techl.htm).

EPA Response

Consistent with the requirements of section 316(b), EPA's assessment of design and construction technologies for this rule has focused on those deemed available. However, both Track I and Track II provide flexibility for permittees to select and implement the design and construction technologies that are most effective in minimizing impingement and entrainment. In this way, and particularly given the flexibility under Track II to demonstrate alternative effective approaches, the rule provides flexibility in the use of design and construction technologies and promotes the development and use of innovative technologies. EPA may specifically address the use of experimental behavioral devices in future guidance on this rule.

Comment ID 316bNFR.077.012

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Frank Rue

Organization Alaska Department of Fish and Game

What is the Role of Restoration Measures: The proposed rule states that EPA believes there are limits on the ability of direct control technologies (e.g., requirements concerning location, flow, and velocity) to eliminate environmental harm from cooling water intake structures in all circumstances. Therefore, EPA envisions using restoration measures, such as wetland restoration/creation, fish hatcheries or fish stocking programs, removing impediments to fish migration, etc., as mitigation for adverse effects to aquatic organisms or habitat. Although we believe that there are few circumstances where proper siting, flow requirements, and fish screening cannot be implemented to eliminate environmental harm, ADF&G agrees that the proposed rule must allow EPA some flexibility to develop creative mitigation. However, we recommend that EPA coordinate and obtain approval from state and federal fisheries agencies for restoration plans that rely on measures other than direct control technologies. Many state agencies, including ADF&G, have fish stocking policies and require permits for in-water work and activities that affect fish passage and for the collection or transfer of fish. Additionally, because many aquatic systems in Alaska have little disturbance history, opportunity for habitat restoration within project watersheds may be very limited.

Restoration plans that involve fish hatcheries or fish stocking, removing impediments to fish migration, etc., affect many user groups and are tightly regulated under Alaska statutes and regulations to manage fisheries, protect wild fish stocks, prevent disease transmission, etc. State and federal fisheries agencies may have additional information to provide regarding fish or habitats at risk, as well as differences in specific applied policies regarding adequacy of an applicant's proposed mitigation. Although we support the Clean Water Act §404 mitigation sequence, wherein environmental impacts are avoided and minimized prior to consideration of compensatory mitigation measures, we believe that this policy has not always been applied evenly in Alaska. We can recall several projects where the Corps of Engineers accepted off-site, out-of-kind mitigation, or in-lieu funding toward land trusts, with little or no coordination with fish and wildlife agencies. This type of unilateral decision-making can lead the regulated community to expect similar mitigation requirements in future project reviews, which if coordinated with other agencies, may result in some forms of mitigation being found unacceptable.

EPA Response

EPA agrees that working closely with state and federal fisheries is important when considering restoration measures and has included such a requirement in today's rule Track II. See preamble sections V.B.2.f and VI.L for discussions on restoration measures in Track II.

Comment ID 316bNFR.077.013

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 19.0

Implementation

ADF&G generally agrees with EPA's proposed implementation scenario. We encourage EPA to coordinate with state and federal fish and wildlife agencies early in the permitting process. In Alaska, state permitting is coordinated by the Division of Governmental Coordination (DGC), Office of the Governor, Office of Management and Budget. DGC will elicit comments from ADF&G, Alaska Department of Natural Resources and Alaska Department of Environmental Conservation. Again, the schedule for implementation may take somewhat longer in Alaska because of the dearth of river and stream flow data throughout the state.

EPA Response

EPA supports the participation in the permitting process by relevant state and federal agencies and recognizes that NPDES-delegated states may choose to involve these agencies in the formal application process. EPA also recognizes that some states, such as Alaska, may not have the required data as readily available as other states. EPA intends to develop a model permit and permitting guidance to assist permitting authorities in implementing the requirements of today's final rule.

Comment ID 316bNFR.077.014

Subject Matter Code MISC

Miscellaneous Comment

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Because the vast majority of our water resources are undeveloped, those resources represent the state's potential for future growth. Therefore, the proposed rule is very important to Alaska. Alaska presently has few facilities that withdraw two million or more gallons per day (MGD). There is a proposal for the expansion of a steam generator project in Anchorage that would use approximately 2.7 MGD for once-through condenser cooling water. In southeast Alaska, new industrial operation using large quantities of water will likely be developed at the sites of two recently closed pump mills.

EPA Response

No response is necessary.

Comment ID 316bNFR.077.015

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

EPA requested comment on whether a higher threshold (such as 25 MGD) might be appropriate for a facility that uses 10 percent or less of a water body at critical low flow periods. We recommend that the threshold not be increased for these situations. Needs for screening depend on all of the factors we listed above. Even in large water bodies, juvenile salmonids that school near shore are vulnerable to impingement/entrainment at unscreened diversions. In Alaska, EPA would also have the extra burden of determining specific basin discharge characteristics of water bodies. Although Alaska has approximately 40 percent of the nation's freshwater supply, only 456 U.S. Geological Survey (USGS) stream gaging sites have been established in Alaska since 1908. Less than one percent of Alaska's water bodies have been gaged. In the lower 48 states there is approximately one gage site per 400 square miles. There are fewer than 100 stream gages operating in any given year in Alaska, or approximately one gage per 8,000 square miles. Of these gage sites, most have less than 10 years of flow data, far less than the 20 years that the USGS recommends for statistical reliability.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.077.016

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

We agree with EPA's objective pursuant to §316(b) to minimize adverse environmental impact from cooling water intake structures. Section 316(a) is less protective because its objective is to "ensure protection of a balanced indigenous population of shellfish, fish and wildlife." We recommend that §316(b) requirements be applied to non-indigenous, as well as indigenous, fish species. Many introduced populations of fish contribute to significant commercial, recreational, and subsistence fisheries in the state. Fisheries on stocked populations allows resource managers to distribute fishing pressure away from sensitive indigenous populations.

EPA Response

Please see response to comment 316bNFR.026.013. Today's rule is intended to minimize entrainment and impingement impacts for all life stages of fish and shellfish species, including forage and predator species.

Comment ID 316bNFR.077.017

Subject Matter Code 15.13

Discretionary/Voluntary Approaches

Author Name Frank Rue

Organization Alaska Department of Fish and Game

The proposed rule states that EPA is also considering not allowing the use of restoration when permitting new facilities under §316(b) because restoration measures may not be effective in compensating for the specific impingement and entrainment losses caused by cooling water intake structures. ADF&G agrees that permits for new facilities should be denied without prejudice if they cannot be sited and designed to protect fish and habitat resources. Restoration may be a more applicable approach to mitigation at cooling water intake facilities that existed prior to implementation of the proposed rule.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II.

Comment ID 316bNFR.077.077

Subject Matter Code DELETE

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Author Name Frank Rue

Organization Alaska Department of Fish and Game

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Comment ID 316bNFR.077.15

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Frank Rue

Organization Alaska Department of Fish and Game

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Eugene Steadman, Jr.

On Behalf Of:

Celanese

Author ID Number:

316bNFR.201

Comment ID 316bNFR.201.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Eugene Steadman, Jr.

Organization Celanese

The New Facilities Rule Must Be Evaluated In The Context Of The Upcoming Proposal Related To Existing Facilities.

Even though the current proposal is aimed at new facilities and new cooling water intake structures, many of the provisions in the new facility proposed rule must be viewed in terms of the upcoming proposal on existing intakes. As EPA is well aware, throughout the United States there are a variety of manufacturing facilities as well as utilities that utilize cooling water and therefore have some type of cooling water intake structure. Most of the existing intake structures have been in existence for decades, and those decades of experience have produced no evidence that there is widespread adverse impact to aquatic biota from these intake structures. Certainly, very large intake structures, especially if located in an ecologically sensitive zone, may result in adverse environmental impact. EPA's goal should be to assure that the resources of the regulatory agencies as well as regulated entities are focused on the type of situations that present significant potential for causing adverse environmental impact and therefore warrant further investigation.

EPA must establish a practical and realistic threshold approach for both the new facility rule and the existing intake rule. This threshold approach would be used to determine which cooling water intake structures would be subject to the requirements of the Section 316(b) regulations.

EPA Response

See response to comment 316bNFR.035.005 and the preamble to the final rule.

Comment ID 316bNFR.201.002

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Eugene Steadman, Jr.

Organization Celanese

EPA Should Reconsider Design versus Actual Flow as the Basis of the Threshold Cutoff

For new facilities, because there is no actual flow experience and the design flow is readily available, we agree with EPA's proposal to apply the threshold to intake design flow. When EPA develops a threshold for the existing facility rule, though, reliance on design flow would be inappropriate, for several reasons. For one, design flow may not be ascertainable for older facilities, and the facility may actually be withdrawing more water than the intake structure design flow. Most importantly, design flow will often substantially overstate the true impact that the intake structure has on the source water.

Many facilities have actual intake flows far below the intake structure design flow, either because the intake structure was "over-designed or because the facility has substantially reduced its water usage over time. Treating such an intake structure as if it really were withdrawing at a much higher rate and therefore as if it has greater potential to affect the source water would be unrealistic. Moreover, this situation could remove an incentive for further water usage reductions.

Therefore, we recommend that EPA substitute "actual intake flow" for "design intake flow" in the proposed regulatory language for existing structures and should also include a definition of that term. We suggest that "actual intake flow" be defined as "the highest 30-day average intake flow during the last 5 years." This is a number that should be easy for facilities to determine, and it would assure that a longer averaging period is not masking any peak withdrawal periods.

EPA Response

This rule applies to new facilities that use cooling water intake structures. The Phase II and III rules will address existing facilities.

Comment ID 316bNFR.201.003

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Eugene Steadman, Jr.

Organization Celanese

Comment deleted. Text included in commenr 316bNFR.201.002

EPA Response

No Response Necessary.

Comment ID 316bNFR.201.004

Subject Matter Code	7.1
Definition: New Facility	

Author Name Eugene Steadman, Jr.

Organization Celanese

Definitions Of New And Existing Facilities Need Clarity

If EPA proceeds with the approach in the proposed standard for new facilities, setting stringent default requirements for location and operation of cooling water intake structures, it definitely will be necessary to develop a different set of requirements for existing facilities. As EPA noted, at 65 Fed. Reg. 49064, there are numerous ways in which existing facilities will be more limited in their ability to comply with specific requirements. These include limitations on the location of the intake structure or the percentage of the receiving waters withdrawn through the structure, because the facility's location is fixed, and its manufacturing equipment has already been designed and installed.

Specifically, in terms of the new facility rule, we maintain that EPA must clearly define the applicability of the proposed rule, so that it only covers a "greenfield" plant or a new, substantially independent plant co-located with an existing plant and requiring a new or expanded intake structure. EPA has based the proposed new facility requirements on the assumption that the owner has the option of choosing the location for the facility to allow him to comply with the intake structure location and operation requirements. EPA should make it clear that the "substantially independent" test is based on whether the facility owner could practicably locate the facility elsewhere.

EPA Response

This rule applies to new facilities. Existing facilities will be addressed under future rulemakings (i.e., Phase II and Phase III).

See response to 316bNFR.030.003.

With regard to defining when a facility is substantially independent under 40 CFR 122.29, EPA does not believe it is feasible to project under what circumstances owners and operators are free to select any location they desire for a new facility. For this reason, EPA takes the facility as it is planned for purposes of determining whether it is a new facility. In the final rule EPA does not believe it is appropriate to define the phrase “substantially independent” as used in 122.29(b)(1)(iii) as facilities that could be practicably located at a separate site. Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether ... processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." EPA does not think it is feasible for the permit authority to judge whether the facility could have been elsewhere for the purpose of determining whether the facility is subject to the new facility rules.

Comment ID 316bNFR.201.005

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Eugene Steadman, Jr.

Organization Celanese

EPA's Proposed Threshold Of 2 mgd Is To Low

We strongly support the inclusion of a threshold for application of the 316(b) standards for new facilities, which would avoid applying burdensome procedures to thousands of intake structures with little or no potential for causing adverse environmental impact.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.201.006

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Eugene Steadman, Jr.
Organization Celanese

We believe that the proposed cutoff level of 2 million gallons per day (mgd), however, is too low to accomplish that task. Accordingly we urge EPA to revise this level and set a reasonable threshold for the application on these Section 316 (b) rules.

EPA recognizes that a 2 mgd threshold would still leave almost all of the cooling water flows subject to regulation-99.97 percent in EPA's judgment. 65 Fed. Reg. 49068. It should be obvious that, if exempting smaller sources has any legitimacy at all, as we (and apparently EPA) believe it does, a cutoff that removes only 0.03% of the intake water flows from the regulatory program is inadequate.

One of our manufacturing facilities has a cooling water intake with flows as high as 70 mgd. This facility has been in existence for decades with no significant adverse environmental impact. It is especially important in the context of the rule for existing facilities that the threshold and other provisions of the rule be established to prevent the unnecessary burden of retrofitting facilities that have existed for decades and that are not causing adverse environmental impact.

EPA Response

See response to 316bNFR.072.006.

Comment ID 316bNFR.201.007

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Eugene Steadman, Jr.

Organization Celanese

In Determining If An Intake Is Primarily A "Cooling Water Intake" Or A "Process Water Intake" EPA Should Use "Major Use" Rather Than The Arbitrary 25% Value As Currently Proposed.

The Agency's proposed rule defines a cooling water intake structure as the total physical structure and any associated constructed waterways used to withdraw water from a water of the United States, provided that at least 25 percent of the water withdrawn is used for cooling purposes. As noted by EPA the definition wording "….of at least 25 percent of the water withdrawn is used for cooling purposes..." is a change from the 1976 final rule and 1977 draft guidance definition which stated "...if a facility used the major portion of water drawn through the structure." EPA also states in the proposed rule that "In practice many permitting authorities have interpreted that definition to apply to intake structures if a facility uses more than 50 percent of the water drawn…"

The past interpretations have kept the definition of cooling water intake structure simple. The majority use of the intake water will label the use of the intake structure. Accordingly, we suggest that the Agency adopt a threshold that is simple and in keeping with past (i.e., 1976 final rule and 1977 draft guidance) as well as current practices. Therefore we recommend that the Agency use a "major" use standard to determine if an intake in question is a cooling water intake structure. Thus, if the majority (>50%) of the water is used for cooling purposes, it is a cooling water intake structure, if the majority (>50%) of the water is used for process water, it is a process water intake structure.

Additionally, many industrial facilities often preheat process water with energy captured from operations inside the facility. A common way of doing this is to run the water first through a use where heat will be transferred to the water (such as in a steam condenser) and then use it for other process purposes. Compared to the alternative of discharging the waste heat to the environment in cooling water, this practice conserves both water and energy. Because of the clear environmental advantages of reusing this water and capturing what would be otherwise wasted energy, such waters should be excluded from the definition of cooling water.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to

cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. The definition of "cooling water intake structure" specifies that, if heated water is used in a manufacturing process, it is considered process water for purposes of calculating the percentage of intake flow that is used for cooling purposes in 125.81(c) . Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. EPA also has added language to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. Section 125.81(b) provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further specifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.201.008

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Eugene Steadman, Jr.

Organization Celanese

EPA Must Establish a Reasonable Definition of Adverse Environmental Impact.

The definition of "adverse environmental impact" (AEI) is critical in terms of this rule as well as the forthcoming proposal on existing cooling water intake structures. Since the Utility industry and EPRI have substantial long-term experience with 316 (b) issues in general, and specifically on an improved definition of AEI, we strongly encourage EPA to fully consider the Utility Water Act Group's (UWAG) comments on this topic. We fully endorse the concept of determining fish and aquatic health and vitality based upon fish population-rather than on the possible arbitrary determination of AEI with the impingement or entrainment of one fish.

We agree with the utility industry that AEI must be defined more clearly since the statute requires minimization of AEI. If the EPA does not clearly define AEL a company will never know if it has met its requirements. We believe a site-specific approach, with sensible and clear methods to identify the populations or community to be protected, is a good approach.

EPA Response

Please see responses to comments 316bNFR.069.008 and 316bNFR.014.013.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Donald Neal

On Behalf Of:

Calpine Corporation

Author ID Number:

316bNFR.202

Comment ID 316bNFR.202.001

Subject Matter Code MISC

Miscellaneous Comment

Author Name Donald Neal

Organization Calpine Corporation

Electricity generation, transmission, and distribution is the third-largest industry in the U.S. Only the healthcare and automotive industries are larger. There are 750,000 megawatts of generating capacity in the U.S., and demand for electricity is increasing annually by three percent. This demand equates to 22,500 megawatts of new power needs annually in addition to the need to replace nuclear, hydropower, and aging fossil-fuel plants that are retired from service.

The electric industry has been restructured at the wholesale level nationwide, and retail restructuring is proceeding in most states. Restructuring and healthy competition will lead to lower electricity prices, more reliable service, and reduced pollution. Nevertheless, the country's current population growth, a booming economy, and the increasing use of electricity are straining our nation's power infrastructure. Power shortages have occurred in the Northeast, California, and elsewhere. In addition, the nation's current electricity-producing infrastructure is aging—45 percent of the nation's power plants are over 25 years old—and historically has been a major source of pollution. Older plants cannot adequately satisfy our nation's current energy demands and certainly cannot compete with the new generation of efficient, clean energy plants.

We believe that many of the problems currently facing the electric-generating industry can be prevented in the future only by the addition of new, modern power plants. Modern gas-fired, combined-cycle plants are being built that will lower the cost of electricity and drastically reduce the impact of power generation on the environment. Calpine believes that building these new plants is important to the well being of our country, and EPA should promote this transition from outdated, inefficient, and highly-polluting generation plants to the vastly cleaner and more efficient plants Calpine is building. Unfairly burdening new plants during this transition does not help the nation or the environment.

EPA Response

EPA does encourage the construction of more efficient electricity generating plants. An analysis of the combined cycle facilities in the NEWGen database that would be subject to the new facility rule shows a trend toward the use of closed-loop recirculating wet cooling towers. Nearly 100 percent of these proposed combined-cycle plants meet the most costly capacity reduction requirement of the final new facility rule, making compliance burden on these facilities is very low. In addition, EPA considered the energy efficiency when evaluation whether to require dry cooling for a subcategory of new facilities. One of the reason for not requiring a dry cooling subcategory was because EPA is concerned that it would create a disincentive to building a new combined-cycle facility (with associated lower flows) in lieu of modifying existing facilities, which may have greater environmental impacts. EPA recognizes that combined cycle facilities have other efficiency advantages as well. For example, combined-cycle gas turbines require less water per unit of electricity generated than coal-fired or nuclear facilities. Finally, t The estimated mean annual energy penalty is 0.40 percent of the generating capacity for combined-cycle facilities, which is lower than for coal facilities.

Comment ID 316bNFR.202.002

Subject Matter Code	22.1
CWIS Impacts and Benefits	

Author Name Donald Neal

Organization Calpine Corporation

Calpine believes that the development of a modern fleet of power generation facilities operating in a competitive marketplace will yield important benefits for our nation in four principal areas:

1. Reduced Costs to Our Consumers.
Technological advances in the power generation industry now make it possible to generate power using 40 percent less fuel than the typical utility-style plants that were built in the 1960s and 1970s. This reduction in fuel consumption will help us dramatically reduce the costs of generating power, allowing consumers to realize significant reductions in their electricity bills.

2. Conservation of Resources.
By burning 40 percent less fuel while generating the same amount of electricity, modern power plants will significantly reduce our nation's consumption of fossil fuels. These important resources can then be conserved for future generations of Americans.

3. Enhanced System Reliability.
The explosion of the digital economy has sparked an increase in growth for electric power, as well as the need to ensure that our electrical system can provide reliable sources of power. Unfortunately, our lagging development of new power generation and transmission facilities in the U.S. has further strained our nation's ability to provide highly-reliable electrical power service.

According to past industry norms, a typical utility would provide electrical service with an average reliability rating of 99.9 percent. This level of performance would translate into customers facing average outages of approximately eight hours each year. However, new, high-technology operations demand a much higher level of electrical service; typical internet and high-technology businesses now require service with a reliability rating of 99.9999 percent, the equivalent of having power outages for only a matter of seconds each year.

As we all are aware, power shortages and blackouts can have dramatic impacts on our economy. The State of California already has endured a record eight Stage Two electrical emergencies this summer alone--there was only one such alert in 1999. (The California Independent System Operator ("CAISO"), the entity that oversees the operation of the State's electrical grid, calls Stage Two alerts when available reserve margins fall below 5 percent; Stage Three alerts are called when margins fall below 1.5 percent and result in rolling blackouts.) This summer's record level of service interruptions in California has had a negative impact on the State's economy and environment.

Moreover, more serious impacts to our economy and public safety result from electrical supply shortages that lead to blackouts. A record heatwave on June 14 of this year forced the CAISO to order the implementation of rolling blackouts in the San Francisco Bay Area. The failure to institute these rolling blackouts would have placed the entire Northern California transmission grid in jeopardy of collapse. During these blackouts, power to over 100,000 customers was involuntarily cut, street lights ceased operating, businesses went dark, and elderly citizens were without air conditioning as

temperatures reached over 110° Fahrenheit. The economic cost of the blackouts to Silicon Valley businesses was estimated at between $75 and $100 million.

Thus, our nation's economy will demand a more reliable supply of electrical power in the future. A critical element in providing this reliable power supply will be the addition of new generating facilities. While providing much-needed new capacity, modern plants also operate much more reliably than plants that are 30 and 40 years old and can be counted on when periods of peak demand are reached.

EPA Response

EPA has considered the comment and appreciates the information provided. EPA's record shows that this rule will not unacceptably increase costs to customers, [cite] will not have unacceptable energy impacts, see the preamble, and will not harm the system reliability, see the preamble and Economic Analysis for the final rule.

Comment ID 316bNFR.202.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Donald Neal

Organization Calpine Corporation

Improved Environmental Quality.

Technological innovation has led to dramatic environmental improvements in the generation of electric power. Modern natural gas-fueled plants now typically emit air pollutants at a fraction of what were emitted into the environment by older plants. Comparing emissions from the typical fossil-fueled power plants built in the 1970s versus state-of-the-art facilities constructed under present-day specifications provides dramatic evidence of these improvements. These modern projects can provide the following benefits:

Pollutant	Reduction in emissions, pounds per megawatt-hour
Nitrogen Oxides (NOx)	-97 percent reduction
Carbon Dioxide (CO2, greenhouse gas)	-40 percent reduction
Sulphur Dioxide (SO2)	-99 percent reduction

Thus, the repowering of America's power generation fleet will have a dramatic positive impact on the nation's air quality and environment.

Encouraging electricity generation based upon technology advances and utilizing cleaner resources, like natural gas, will enable American consumers to maintain their current standard of living at the same or reduced electricity cost, while meeting our clean air goals. To achieve these overall goals of increased electricity output, reduced cost, and a clean environment, it is vital that EPA oversee an appropriate regulatory process that promotes the permitting and construction of new electric power plants in an effective and efficient manner.

EPA Response

EPA agrees with the concept to promote permitting and construction of new electric power plants in an effective and efficient manner. The final rule establishes technology-based performance requirements that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. EPA believes that it has chosen the best option that will provide the most protection of natural resource for the most practicable cost within the range of acceptable energy impacts and air emissions.

Comment ID 316bNFR.202.004

Subject Matter Code	6.1
Current Implementation of Sec. 316(b)	

Author Name Donald Neal

Organization Calpine Corporation

The Current Approach Works.

Since 1977, EPA has concluded that the "best technology available" ("BTA") for cooling water intake systems was based on the judgment that "the decision as to [BTA] for intake design, location, construction and capacity must be made on a case-by-case basis." 65 Fed. Reg. at 49,063 (August 10, 2000) (emphasis added). The Agency has not provided any reason for abandoning this conclusion. Instead, EPA indicates that it is under a Consent Decree mandate to "propose" national regulations. . . which it now has done. The Agency also must "take final action" on its proposal. EPA must provide further rationale and reasoning to support proposed national regulations before it takes "final action." If EPA cannot justify the rule and adopt improvements identified in these comments, Calpine recommends that EPA's "final action" be to withdraw the proposal. The Agency set precedent for such an action in the industrial laundries ELG rulemaking.

In fact, EPA has requested comments supporting such an outcome. See 65 Fed. Reg. at 49,064. The reasons are quite obvious. Intake structure, design, location, construction, and capacity are entirely dependent upon the needs of the user and capacity of and type of water resource. Under the current more flexible, case-by-case approach, local permitting authorities have been able to ensure appropriate design requirements that are technologically advanced, but that meet local needs. In other words, new facilities are employing the latest technologies already and no new regulations are warranted.

EPA Response

EPA disagrees. Today's rule furthers the objectives of the CWA by establishing a technology based, two track approach to minimize adverse environmental impact. See preamble section V for a discussion on the basis of today's final rule. See section II of the preamble for the discussion on legal authority, purpose and background of today's regulation.

Comment ID 316bNFR.202.005

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Donald Neal

Organization Calpine Corporation

EPA is not the only agency with regulatory authority over intake structures. Thus, while EPA defers to a case-by-case approach, other agencies have aggressively regulated placement and design of these structures, including the U.S. Army Corps of Engineers. EPA should not impinge upon their regulatory authority. For that reason, Calpine opposes the portion of the proposed rule, 40 CFR § 125.84(f), that allows the Director to address effects of physical Cooling Water Intake Structure ("CWIS") construction under certain circumstances. Calpine already is subject to such regulation by the U.S. Army Corps of Engineers. In addition, many states provide duplicative (to the Corps) regulation of these structures.

EPA Response

Section 316(b) specifically provides, "the location, design, construction, and capacity of cooling water intake structures shall reflect the best technology available..." (emphasis added). The commands of Section 316(b) are supplemental to authorities administered by the Corps of Engineers, including Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. EPA notes, however, that today's rule includes few specific provisions relating to construction. EPA does not believe it impinges on the authority of any other agency.

Comment ID 316bNFR.202.006

Subject Matter Code EXIST

Existing Facility Rule

Author Name Donald Neal

Organization Calpine Corporation

EPA First Should Require Existing Structures to Meet Current Technologies.

EPA's proposal does not make sense from a practical perspective. The proposed rule requires affected facilities to perform significant characterizations of water quality, bathymetry, flow, and biological community structure. These studies require extensive resources that are not warranted, given the level of impact presented by modern combined cycle power plants employing closed loop cooling systems. Calpine estimates that a 540-megawatt combined cycle power plant withdrawing water from a freshwater lake, on average, would withdraw about four million gallons per day ("MGD"). Existing steam electric facilities of this same electrical output employing once-through cooling would withdraw about 500 MGD. Calpine believes that EPA should be encouraging the conversion to and development of electric-generating capacity that employs closed-loop cooling systems. Hence, the Agency should focus its efforts on revising existing structures that do not meet today's standards.

Mandating technology standards for new facilities also exacerbates the disadvantages of constructing new, efficient, and environmentally-friendly plants and widens the technology gap between new and old electricity generators. EPA should have drafted new BTA requirements for existing facilities prior to developing new source standards. In fact, the Agency's proposal does the opposite of fostering efficient water intake structures.

For example, EPA has defined "New Facility" to allow new facilities located at the same site as an existing power plant with an existing CWIS to avoid the requirements of the proposed rule (the Facility G scenario). This loophole would provide a competitive advantage to companies with older facilities with CWISs, many of which have sufficient permitted withdrawal capacity in their once-through cooling systems to easily accommodate the four MGD to seven MGD required for a large (greater than 500 megawatts) combined cycle power plant. Although Calpine acknowledges that the existing CWISs will be subject to regulation in a future proposed rule, these regulations may not be implemented for years and likely will be less restrictive than those for new facilities. Thus, EPA is encouraging the prolonged use of older structures at the expense of new producers and the environment.

Calpine believes that EPA should defer action on new facility regulation and focus instead on existing facilities. Most of the examples cited in the preamble to the proposed regulations apply to existing facilities that currently do not implement BTA. These older facilities pose a much greater risk to the aquatic environment than new facilities, which will be required to implement current BTA even through the case-by-case approach. In particular, older facilities employing once-through cooling will have impingement and entrainment impacts that are greater by orders of magnitude than a modern combined cycle power plant employing closed loop cooling.

If EPA proceeds with its current rulemaking, it must avoid creating a competitive disadvantage for new facilities and delay implementation of the final rule until a rule for existing facilities goes into

effect. EPA's bifurcation of this rule appears to be unprecedented in ELG-like rulemaking and creates a dangerous precedent that could alter the electricity generation market.

EPA Response

EPA disagrees. The consent decree entered in the United States District Court, Southern District of New York in Riverkeeper Inc., et.al v. Whitman, No. 93 Civ. 0314 sets forth three phases for developing regulations implementing section 316(b) of the Clean Water Act. Phase I addresses new facilities and is the subject of today's final rule and preamble. Given the large percentage of facilities that the record shows plan to install wet cooling towers in the baseline, EPA does not believe there is a basis to find this rule will cause any competitive disadvantage. See the Economic Analysis for the rule. Phase II and III will address other facilities such as existing facilities and manufacturing facilities which withdraw cooling water above a level yet to be set. In addition, EPA believes that addressing new facilities first make sense because they have the ability to include best technology available in their facilities at the outset. Addressing existing facilities is also important and will be done in Phases II and III of this rulemaking. EPA will evaluate these facilities and their unique aspects accordingly during that rulemaking.

Comment ID 316bNFR.202.007

Subject Matter Code 21.0

Cost/Benefit Analysis

Author Name Donald Neal

Organization Calpine Corporation

EPA Must Justify its Final Technology Standards and Provide a Cost-Benefit Analysis.

Based on the legislative history and EPA's prior practices, the Agency includes in its BTA standards development analysis a cost consideration commensurate with the more widely-used Best Available Technology ("BAT") standard (BAT dictates technology requirements under the ELG and NPDES programs.) In fact, under the ELG program, EPA conducts a cost-benefit analysis to determine the feasibility of its technology standards and to compare the impacts of various industry-specific rulemakings. The Agency should devise a method for conducting a cost-benefit analysis for this rule.

EPA Response

EPA disagrees with the commenter's argument that a revised cost-benefit analysis is required. EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. For new facilities subject to this rule, EPA finds that the preferred two-track option represents the best technology available for minimizing adverse environmental impact. With respect to new facilities, the technologies used as the basis for this option are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts. Similarly, the technologies used as the basis for this option also have acceptable non-aquatic environmental impacts. EPA has also considered the potential benefits associated with the implementation of these technology requirements; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures.

Comment ID 316bNFR.202.008

Subject Matter Code 22.1

CWIS Impacts and Benefits

Author Name Donald Neal

Organization Calpine Corporation

EPA must consider additional, less tangible costs in its cost estimate. The cooling water intake structure is an important element of power generation and changes to that structure have other environmental impacts. For instance, it is standard industry knowledge that employing a once-through cooling technology results in the lowest air emissions on a per-megawatt basis. Thus, requiring specific cooling water technology under this proposed rule has impacts on air emissions that also are regulated by EPA under the Clean Air Act. EPA should not – and does not have the expertise – to mandate specific in-plant cooling technologies. The Agency should only provide guidance for minimizing environmental impacts associated with the already chosen technology. This is not to say that EPA cannot encourage efficient technologies; only that it must account for all economic impacts associated with such actions.

A multi-media approach to this rulemaking is further supported by Section 316(b) of the Clean Water Act. That section requires EPA to "minimiz[e] adverse environmental impact." Calpine believes that Congress intended for EPA to look at all environmental impacts, including other multi-media considerations associated with intake structures, above and beyond water-related impacts. Had Congress only intended for EPA to look at impingement and entrainment ("I&E"), then it would have specifically narrowed the Agency's responsibilities to those associated with water resource impacts.

EPA Response

EPA has conducted analyses of potential effects of the final rule on air emissions and found these to be acceptable. See the preamble and the Development Document for the final rule.

Comment ID 316bNFR.202.009

Subject Matter Code 24.5

EEA - Estimation of Benefits

Author Name Donald Neal

Organization Calpine Corporation

EPA also must determine how to quantify benefits. Under its ELG program, the Agency has devised a method for assessing benefits based in part on the concept of "pollutant equivalents" or PEs. Because this rule does not address pollutant discharges, but rather impacts associated with removing water from a water resource, EPA must assess the value of the fish and other animals protected as a result of implementing the technology on a national scale and then be able to relate that value to specific sites. This is vastly more difficult than assessing intake structure impacts on a case-by-case basis where specific potentially-impacted species are known. EPA's potential inability to justify national standards using peer-reviewed scientific standards favors the Agency's continued adherence to its case-by-case approach.

EPA Response

This comment is correct in noting that the benefits of this regulation cannot be reflected using the toxicity-based "pollutant equivalents" approach that EPA typically applies to effluent limitation guidelines regulations. This is because most effluent guidelines address chemical discharges rather than I&E.

As the comment notes, the challenge posed in trying to estimate the benefits of a national standard from changes in facility- and site-specific I&E impacts is considerable. It is for this reason that no quantified benefits were estimated for the New Facilities rule. As the comment further notes, the challenge of estimating benefits from reduced I&E suggests a more site-specific approach may be necessary for estimating benefits. In fact, a main thrust of several comments is that the Agency should do a site-specific benefit analysis (e.g., comment numbers 316bNFR.068.087 and 316bNFR.068.033). This is an approach the Agency is considering pursuing as part of the Existing Facilities portion of the 316b rulemaking.

Comment ID 316bNFR.202.010

Subject Matter Code 9.3

Documentation of I & E Impacts

Author Name Donald Neal

Organization Calpine Corporation

Calpine believes that EPA uses misleading examples in documenting entrainment and impingement impacts from new facilities. Both of the facilities cited in this section are existing facilities that lack modern BTA and withdraw hundreds of millions of gallons per day more water than would a new electric generating facility employing closed loop cooling. EPA should instead either use more relevant power plant examples or provide some perspective on the likely impacts from the existing examples if they employed closed loop cooling systems and/or current BTA.

EPA Response

EPA acknowledges and agrees with the commenter that past data from selected existing facilities may not reflect current impingement and entrainment rates at new facilities which have implemented closed cycle cooling in conjunction with other technologies to significantly limit impingement and entrainment mortality.

EPA disagrees that it uses misleading examples in documenting entrainment and impingement impacts from new facilities. The Agency believes that it used the best information available for the final rule and much of this information came from existing facilities. There is very little, data documenting the efficacy of facilities using closed cycle cooling in conjunction with other technologies to significantly limit impingement and entrainment mortality. Historical studies provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. EPA asserts that the examples of environmental impact provided in the proposed rule are illustrative of the types of effects associated with cooling water intake structures.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes and issues raised in this comment please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.202.011

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Author Name Donald Neal

Organization Calpine Corporation

Calpine strongly objects to the alternative, where "…adverse environmental impact would be deemed to occur whenever aquatic organisms are impinged or entrained as a result of the operation of a cooling water intake." This definition clearly was not contemplated as part of the 316(b) requirements and would essentially prohibit cooling water withdrawals. Calpine designs the cooling systems of its facilities on a site-specific basis considering environmental, economic, and energy impacts. In some cases a CWIS provides more efficient and economical operation (which results in decreased price pressure for electricity) and less environmental impact when considering not just impacts to water resources but impacts to air and land.

EPA Response

Please see responses to comments 316bNFR.029.013 (AEI interpretation), 316bNFR.014.013 (two-track framework), and 316bNFR.501.003 (nonaquatic impacts).

Comment ID 316bNFR.202.012

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Donald Neal

Organization Calpine Corporation

EPA Should Exempt Efficient Water Usage Less Than 20 MGD.

Calpine supports EPA's attempts to encourage efficient use of intake water. However, if it proceeds with this rulemaking, the Agency could further encourage efficiency by exempting facilities from these national standards if they use less than 20 MGD. EPA has proposed a two MGD exemption level, which provides little benefit except for very small withdrawals. Calpine projects that most of its facilities employing closed loop wet cooling systems supplied by fresh water will use four to seven MGD. If salt water or brackish water is used then consumption would increase to about 20 MGD, depending on the number of cooling tower cycles of concentration. Thus, in response to EPA's request for comments, Calpine suggests an exemption from national standards for CWIS that draw less than 20 MGD.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.202.013

Subject Matter Code 7.1

Definition: New Facility

Author Name Donald Neal

Organization Calpine Corporation

EPA Should Treat All Permit Applicants as Existing Facilities.

Calpine objects to defining a new facility as one that "… commences construction after the effective date of this rule…." This requirement would create a great deal of uncertainty for facilities subject to this rule that obtain their NPDES permit before the effective date of the rule but commence construction after such date, or have applied for a NPDES permit but have not yet been granted a permit. Calpine recommends EPA modify the definition of "New Facility" to exclude those facilities that have applied for a NPDES permit before the effective date of the rule.

EPA Response

The Agency chose the commencement of construction date because it was generally consistent with the term "new source" in the existing NPDES permitting regulations and it should provide adequate notice and time for facilities to implement the technological changes required under the rule. The date a facility commences construction is clarified at 40 CFR 122.29(b)(4). This provision describes certain installation and site preparation activities that are part of a continuous onsite construction program; it includes entering into specified binding contractual obligations. Thus, under this rule facilities that are constructed or commence construction within the meaning of 40 CFR 122.29(b)(4) prior to or on the effective date of the final rule are not new facilities. Those that commence construction after the effective date of this rule and meet the other regulatory thresholds defined in § 125.81 are subject to the requirements of this rule.

Comment ID 316bNFR.202.014

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Donald Neal

Organization Calpine Corporation

The Agency Must Clearly Define CWIS.

Calpine believes that EPA has established an arbitrary definition by only regulating structures where at least 25 percent of the flow is used for cooling purposes. Calpine does not necessarily object to this definition, but requests that EPA provide additional information in the regulation regarding how one determines whether it exceeds this threshold (e.g., annual average, design capacity, etc.).

EPA Response

In the final rule, the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes must be measured on an average monthly basis. A new facility meets the 25 percent cooling water threshold if, based on the new facility's design, any monthly average over a year for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.202.015

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Donald Neal

Organization Calpine Corporation

EPA Must Clarify its Flow Requirements Associated With Any Exemption.

Calpine requests that EPA not include intake structures that withdraw two MGD [or preferably 20 MGD] or less based on mean annual flow (for a river) or volume (for a lake). Flow and/or volume data may not be available at sufficient accuracy to render such a determination without costly and time-consuming monitoring. In addition, the proposal to include intake structures less than two [or 20] MGD that exceed one percent of the flow or volume is arbitrary. Calpine believes that the percentage of flow above which significant aquatic impacts occur would vary based on existing river or lake conditions and future water quality goals.

EPA Response

No percentage flow threshold has been added to the applicability provisions; proportional flow limits exist in the rule. EPA believes sufficient data are available to determine source water flow, including, for rivers and streams, publicly available flow data from a nearby U.S. Geological Survey (USGS) gauging station or actual instream flow monitoring data that the facility has collected itself, for estuaries and tidal rivers, available tidal velocities that can be obtained from the Tidal Current Tables formerly published by the National Ocean Service of the National Oceanic and Atmospheric Administration (NOAA) and currently printed and distributed by private companies (available at bookstores or marine supply stores), or, for lakes or reservoirs, a narrative description of the waterbody thermal stratification (typically defined by the thermocline). See Section VII.B.1.d. of the rule.

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.202.016

Author Name Donald Neal

Organization Calpine Corporation

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

The Agency's POTW Source Exclusion Should Not Relate to Discharge Situations.

Calpine supports EPA's decision not to regulate under the proposed rules new facilities that purchase cooling water from a municipal utility (Calpine assumes "municipal utility" to include any arrangement by which cooling water is purchased from a publicly-owned water supply system that operates a surface water intake). Calpine does not support EPA limiting this arrangement to situations where the facility would discharge wastewater to a publicly-owned treatment works ("POTW"). Calpine believes that the arrangement should include situations where the new facility would discharge directly to a water of the U.S. The environmental impacts relevant to Section 316(b) are the same in both cases.

EPA Response

Section 125.81(b) of the final rule does not contain this limitation. It provides that "use of cooling water" does not include obtaining cooling water from a public water system. Thus facilities that obtain cooling water from a public water system are not subject to the rule, regardless of whether or not they discharge to a POTW.

Comment ID 316bNFR.202.017

Author Name Donald Neal

Organization Calpine Corporation

Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

EPA Should Not Mandate Internal Operational Technologies.

Calpine objects to the requirement to "reduce intake flow to a level commensurate with that which could be attained by a closed cycle recirculating cooling water system." Not only would this requirement dictate the minimum cooling technology that could be employed by a new facility, but it also would limit Calpine's ability to design a closed cycle cooling water system that reflects a balance between reducing environmental impacts while optimizing facility operation and maintenance programs. Calpine is concerned that this requirement creates the potential for EPA to determine the cycles of concentration for a cooling system. EPA would tend to favor minimizing water withdrawal (i.e., increasing cycles of concentration), which could have a negative impact on plant operation and maintenance. EPA must be careful not to structure its regulations in such a way as to dictate actual cooling technologies.

EPA Response

See responses to comments #316bNFR.068.010 and #316bNFR.068.011.

Comment ID 316bNFR.202.018

Author Name Donald Neal

Organization Calpine Corporation

Subject Matter Code 13.1

Requirement of 0.5 fps

Calpine does not object to the specification of a maximum-intake velocity of 0.5 feet per second ("ft/s"). However, permitting authorities must be given case-by-case flexibility to increase the intake velocity if that authority determines that the increase would not further impact aquatic resources.

EPA Response

EPA agrees that the record in this rulemaking supports EPA's conclusion that the 0.5 ft/s requirement is scientifically based, technically sound, protective of aquatic resources, and technically available and economically practicable as demonstrated by the fact that it is frequently achieved at recently built facilities.

EPA notes that permit applicants who wish to build a facility using higher intake velocities have the option, under Track II, to conduct site-specific studies and seek to demonstrate that their alternative will reduce impingement and entrainment as effectively as the Track I requirements, including the velocity limit of 0.5 ft/s.

Comment ID 316bNFR.202.019

Subject Matter Code	10.04
Site-specific Permit Flexibility	

Author Name Donald Neal

Organization Calpine Corporation

Calpine supports EPA's proposal to incorporate flexibility by allowing the permitting authority to determine whether a cooling water intake structure is minimizing adverse environmental impacts although, as discussed in previous paragraphs, Calpine believes that the proposed rules should focus solely on adverse aquatic impacts regardless of the cooling technology selected. In particular, Calpine would like EPA to include in the final rule the language at 65 Fed. Reg. 49,080 that allows new facilities to request alternative technology-based requirements. However, Calpine requests that EPA delete the term "clearly and convincingly" from the proposed language. This standard is not defined and significantly restricts the operational flexibility the provision is intended to provide.

EPA Response

The EPA has chosen to interpret "adverse environmental impacts" in a manner that authorizes controls which minimize entrainment and impingement.

EPA believes that the two-track technology-based framework described in today's rule does provide new
facilities with the flexibility to minimize AEI through performance-based standards (Track I) or based on site-specific considerations (Track II). In the case of many new facilities, AEI may be presumed in advance and the Track I performance-based standards option can be selected. If a facility is uncertain about the potential for AEI or deems the potential for AEI to be unlikely based on site-specific conditions, the facility can choose the Track II option and show through biological monitoring that comparable entrainment and impingement minimization will be achieved. Thus, under today's rule facilities may choose to implement Track I performance based standards or conduct site-specific biological monitoring under Track II to show comparable minimization of entrainment and impingement.

In section VII. H. of the Preamble, Alternative Requirements are discussed. "In some cases, data that could affect the economic practicability of requirements might not have been available to be considered by EPA during the development of today's rule. Therefore, EPA is including section 125.85 to allow for adjustment of the requirements of section 125.84 in certain limited circumstances…. Under this section, any interested person may request that alternative requirements that are less stringent than the requirements of section 125.84 would be approved only if the Administrator determines that compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during development of the requirement at issue, the alternative requirement requested is no less stringent than justified by the wholly out of proportion cost, and the alternative requirements will ensure compliance with other applicable provisions of the Clean Water Act and any applicable requirements of State Law."

EPA disagrees with the commenter that the term "clearly and convincingly" should be struck from the rule language in that provision. EPA believes that a rigorous analysis should be required to be performed to show that a facility would have costs "wholly out of proportion" with those considered

during this rulemaking.

Comment ID 316bNFR.202.020

Author Name Donald Neal

Organization Calpine Corporation

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Calpine strongly objects to the regulatory alternative based on zero-intake flow. Calpine does not believe that EPA should mandate cooling technologies for power plants. For some projects, the overall environmental and economic benefits of wet-cooling technology outweigh those of air-cooling. Calpine would support dry cooling when sufficient water is not available to supply a closed-loop wet cooling system. In fact, Calpine has proposed several projects employing air-cooled condensers. Following a thorough site-specific evaluation of cooling alternatives, it was evident in each instance that either a reliable source of water for a wet cooled project was not available or site-specific conditions favored dry cooling despite the demonstrated availability of a reliable source of water. This further supports the fact that current case-by-case determinations ensure that the best technologies are being utilized.

EPA Response

EPA has not adopted the regulatory alternative based on zero or near-zero intake or the case-by-case approach for the reasons discussed in Section V.C of the preamble to the final rule.

EPA notes that the technology-based performance requirements and flexible compliance framework of the final rule does not "mandate" cooling technologies for power plants.

EPA agrees with the statement made by the commenter supporting dry cooling technologies "when sufficient water is not available to supply a closed-loop wet cooling system." As such, EPA encourages the types of recent dry cooling projects adopted by the commenter.

Comment ID 316bNFR.202.021

Subject Matter Code MISC

Miscellaneous Comment

Author Name Donald Neal

Organization Calpine Corporation

EPA must recognize that the particular cooling technology ultimately chosen for a project is affected by local community opinions. Calpine works closely with host communities during the project design stage to incorporate host community design preferences. In our experience, the major design considerations for a host community include aesthetics, noise, and water supply. Local communities tend to favor wet cooling over dry cooling when sufficient water is available because it can be more aesthetically pleasing and produce less noise. If EPA were to mandate that all new facilities should be dry-cooled, then local communities' interests often would be compromised.

EPA Response

The final rule does not mandate dry-cooling for new facilities. EPA recognizes that in some instances a particular cooling technology ultimately chosen for a project is affected by local community opinions. For example, in a case where visible plumes from evaporative cooling towers was a significant issue for the public and other stakeholders on the local level, alternative or additional technologies have been adopted in response to stakeholder sentiment. The two-track regulatory framework adopted by EPA in the final rule allows for this local, site-specific decision process. In the case where facilities, or public stakeholders, determine that an alternative technology to a traditional flow reducing type (such as recirculating wet cooling towers or cooling ponds) is necessary, the two-track methodology provides the flexibility for an equivalent aquatic environmental impact minimization to occur without producing a non-aquatic impact.

Comment ID 316bNFR.202.022

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Donald Neal

Organization Calpine Corporation

EPA Should Reconsider Certain Siting Issues.

Calpine is concerned that EPA's goal to locate CWISs in the deepest open-water channel of a river would conflict with the U.S. Army Corps of Engineers' direction to locate such structures outside of areas subject to navigation. EPA should defer to the Corps regarding specific placement of a CWIS.

EPA Response

The final rule does not contain this provision. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.202.023

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Donald Neal

Organization Calpine Corporation

Calpine supports EPA's proposal to use the littoral zone to define the area where more stringent requirements may apply. The littoral zone has significantly more biological significance than the alternative of determining requirements based on distance from shore.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities, and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.202.024

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Donald Neal

Organization Calpine Corporation

Calpine urges EPA to consider allowing applicants to rebut the presumption that 50 meters should be the distance above which CWIS requirements would be less restrictive. There may be situations where bathymetry is such that a distance of less than 50 meters would adequately protect aquatic resources (e.g., a steep drop in depth after the littoral zone). Calpine also requests clarification from EPA as to whether the 50 meters should be horizontal distance or ground-surface distance.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.202.025

Subject Matter Code 12.11

5% Mean Annual Flow

Author Name Donald Neal

Organization Calpine Corporation

The Agency Should Utilize the 7Q10 Flow Standard.

Establishing design intake flows will help companies decide the cooling technology for a project, but Calpine is uncomfortable with the restriction based on mean annual flow. Instead, EPA should regulate CWISs based solely on 7Q10 flow, which is the parameter of most concern to states based on our project development experience. The 7Q10 standard is more meaningful to protecting aquatic resources, because it is the time when the water withdrawal would be a relatively higher percentage of the overall river flow.

Calpine supports EPA's limitation of cooling water withdrawal to less than 25 percent of the 7Q10 flow. However, Calpine requests that EPA consider allowing applicants to exceed the 25 percent withdrawal if they can demonstrate to the permitting authority that the aquatic impacts from the additional withdrawal would not be significant.

EPA Response

EPA has opted not to include the 25% 7Q10 standard in today's final rule.

EPA believes it has presented ample evidence demonstrating a significant decrease in the level of impingement and entrainment when intake flow is minimized. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment. EPA believes the intake capacity standard established under today's final rule provides an adequate level of protection and is economically practicable and technically available to all new facilities.

Comment ID 316bNFR.202.026

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Donald Neal

Organization Calpine Corporation

EPA Can Streamline Baseline Characterizations.

Calpine recommends that EPA allow the permitting authority to consider allowing existing data from the affected water body to satisfy the requirements for source water baseline biological characterization. Such data may exist within a reasonable distance from a proposed new facility CWIS and it could be supplemented with site-specific bathymetry and characterization data for a more limited (i.e., three months as described below) monitoring program.

Calpine urges EPA to provide guidance regarding the scope and content of the source water baseline biological characterization. Clear guidance from EPA would help applicants to control the cost and schedule while completing a program that provides the regulators with sufficient information to render a decision.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.202.027

Subject Matter Code	19.1
Submittal of Required Information	

Author Name Donald Neal

Organization Calpine Corporation

EPA's Schedule for Permitting is Unrealistic – Actual Permitting Time Will be Overly Burdensome.

Calpine believes that EPA's example schedule for permit application activity (Exhibit 2) is unrealistic. In fact, it will take new facilities significantly longer (and greater cost) to comply with EPA's proposal than the Agency states. EPA should consider the following:

*EPA assumes that applicants can submit their NPDES permit applications 180 days before commencing operation. Calpine is required to obtain NPDES permits for operation prior to construction. This requirement is imposed on us by many of the states where we have or will locate plants. In addition, the financial institutions that fund the construction of many of our facilities require the NPDES permit as a condition of financing.
*The 180-day permit review and approval time specified by EPA is unrealistic. Calpine believes that a one-year review and approval would be more realistic for a facility proposing a CWIS. Agencies routinely take longer than 180 days to issue NPDES permits for Calpine projects that simply discharge cooling water blowdown to a receiving water.
*EPA's timeline also assumes submitting the NPDES permit application immediately after the 365-day baseline biological characterization is complete. It is unrealistic to assume that this is possible. More realistically, it will take two months to analyze the data and prepare a report to support a permit application.

To comply adequately with all of EPA's proposed requirements, facilities must start planning more than four years in advance of operation. This is a ridiculous schedule. Based upon the proposal, EPA's published schedule (Exhibit 2) should look more like this:

Activity	Days prior to Operation
Sampling Plan	1610
Baseline Biological Characterization	1520
Prepare NPDES application	1155
Apply for NPDES permit	1095
Commence Construction	730

The above schedule would require Calpine to submit a sampling plan more than four years before the expected operating date for the facility. This is clearly an excessive regulatory burden, especially considering the relatively minor environmental impact presented by facilities employing closed-cycle cooling compared to facilities with once-through cooling.

Therefore, in order to streamline the regulatory process for facilities that propose closed-loop cooling systems, Calpine recommends that EPA impose a less time-consuming biological characterization program that could be based on a limited three month sampling program, an extensive literature review, and a CWIS intake structure design that incorporates BTA plus some additional measures. The 3-month sampling program would be sufficient to characterize the site-specific conditions near the

proposed CWIS. The literature review would identify if there were likely to be species of regulatory or commercial concern in the area that require protection, and the requirement to incorporate measures above and beyond BTA would provide an added margin of protection to aquatic resources. This approach would save an applicant about one year.

Calpine requests that EPA specify in its regulations a mandatory 30-day review and comment period for the sampling plan for the source water baseline biological characterization program. If the agency does not respond within 30 days then the plan should be considered approved. This is the only way to ensure that agencies will review the plan in a timely manner.

EPA Response

EPA recognizes the importance of expedited decisions and the desire for short construction schedules. For these reasons, the final rule establishes technology-based performance requirements, based on a two-track approach. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In particular, EPA deleted the requirement under the final rule, requiring one year of source water sampling prior to submitting an application for an NPDES permit.

Comment ID 316bNFR.202.028

Subject Matter Code 20.3

Head Loss Monitoring

Author Name Donald Neal

Organization Calpine Corporation

Monitoring Requirements Need Clarity.

Calpine requests that EPA clarify the requirement to monitor head loss across the intake screens. A daily inspection program would be effective to ensure the unobstructed operation of the intake structures. Continuous monitoring is not necessary after an initial compliance determination.

EPA Response

EPA has determined that quarterly head loss monitoring is required to demonstrate consistent compliance with the velocity requirements and that visual inspection alone is not enough. Quarterly inspections will ensure that there is a record of demonstrated compliance for individual facilities. EPA is requiring head loss monitoring to show that each facility is operating and maintaining the cooling water intake structure so as to meet the velocity requirements in Track I and Track II (if any) after the plant is up and running. EPA concluded that this is the most appropriate and least burdensome way to demonstrate compliance because head loss is easily established by a simple measurement of the height of the water both in front of and behind the screen. Head loss indicates that the flow through the screen has been reduced with a resulting increase in velocity across the screen face. Head loss is caused either by clogging or other debris problems. Increased velocity increases the potential for damage to aquatic communities through entrapment and impingement. Maintaining consistent velocity as shown through head loss measurements demonstrates that the facility is maintaining an appropriate cleaning and maintenance schedule.

Comment ID 316bNFR.202.029

Subject Matter Code 20.4

Screen/Through-Screen/Approach Velocity

Author Name Donald Neal

Organization Calpine Corporation

Calpine requests that EPA delete the annual requirement to monitor intake velocity. A one-time measurement confirming engineering design specifications combined with a daily inspection program should be adequate, particularly when EPA considers that it is in the facility's best interest to keep intake structures clear of obstructions to maximize efficiency.

EPA Response

EPA disagrees with the commenter. EPA is requiring, at a minimum, quarterly head loss monitoring to demonstrate that each facility is operating and maintaining the cooling water intake structure in a manner consistent with the velocity requirements in Track I and Track II (if any). While facility operators will seek to maximize the efficiency of operations, it is not clear that without a requirement to measure velocity periodically that a facility will necessarily be operated within the design velocity parameters. Requiring operations within the design velocity will ensure that intake structures are maintained so as to keep adverse consequences to aquatic communities to a minimum.

EPA concluded that this is the most appropriate and least burdensome way to demonstrate compliance because head loss is easily established by a simple measurement of the height of the water both in front of and behind the screen. Headloss indicates that the velocity of flow through the screen has been reduced with a resulting increase in velocity across the screen face. Head loss is caused either by clogging or other debris problems. Increased velocity increases the potential for damage to aquatic communities through impingement and entrapment. Maintaining consistent velocity as shown through head loss measurements demonstrates that the facility is maintaining an appropriate cleaning and maintenance schedule.

Comment ID 316bNFR.202.030

Subject Matter Code OPP

General Statement of Opposition

Author Name Donald Neal

Organization Calpine Corporation

CONCLUSION

Calpine appreciates this opportunity to comment on EPA's proposal. The Agency should consider seriously withdrawing this proposal and instead continuing to rely on case-by-case determinations. In the alternative, EPA should modify its proposal as outlined in these comments. New facilities should not be burdened with new regulations until existing facilities also must comply.

EPA Response

EPA has chosen to a technology-based approach to the new facility rule because EPA views this as a reasonable interpretation of the requirements of section 316(b) of the CWA. EPA believes that such an approach is particularly appropriate for new facilities, and because regulatory certainty is important for new facilities.

EPA 's national requirements for existing facilities may be different than the requirements in the rule. The existing facility rules will follow shortly after the new facility rule. Therefore, EPA does not find it unfair to deal with these rules using a phased approach.

Comment ID 316bNFR.202.031

Subject Matter Code MISC

Miscellaneous Comment

Author Name Donald Neal

Organization Calpine Corporation

EPA's proposed rule governing cooling water intake structures for new facilities has the potential to cause a significant adverse impact to Calpine's future power project development program. If EPA determine's that new national regulations are warranted, such regulations first ought to be required for older existing structures, which EPA already has determined cause more significant environmental impacts than new intake structures. Finally, if new facilities must be further regulated by this rule making, EPA must alter significantly its proposal in order not to have deleterious impact on new, environmentally-friendly electricity generation facilities.

EPA Response

With respect to new facilities, the technologies used as the basis for the final new facility rule are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts. The rule is not expected to result in any significant impact on generation and distribution of electricity, because most of the electric generation facilities are expected to meet most of the rule’s requirements in the baseline. EPA therefore concludes that this rule will not result in a significant impact on industries or the economy, or have a significant adverse impact to future power project development program.

With respect to the commenter's assertion that there may be some inequity of treatment between new facilities and certain existing facilities, EPA will address this issue when it addresses what substantive requirements apply to existing facilities. EPA will address existing facilities fully in Phase II and Phase III rulemakings.

Comment ID 316bNFR.202.032

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Author Name Donald Neal

Organization Calpine Corporation

Calpine believes that EPA's overall cost estimates for this rule are significantly underrepresented. For example, Calpine asks EPA to clarify the basis for the statement that the proposed baseline characterization study would be less comprehensive than previous 316(b) studies. Neither the preamble nor the proposed regulations appear to support that statement. The $32,000 EPA cost estimate for a baseline characterization is, in our experience, too low by an order of magnitude. Actual expenditures for this work likely will exceed $250,000 based on actual experience and recent proposals received by Calpine for similar work associated with CWIS development and permitting.

EPA Response

EPA has revised the cost estimates. (See the Economic and Engineering Analysis of the Final 316(b) New Facility Rule, 2001).

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Marilyn Booth

On Behalf Of:

Conectiv

Author ID Number:

316bNFR.203

Note

Fully supports the comments made by UWAG (316bNFR.068) and EPRI (316bNFR.056)

Comment ID 316bNFR.203.001

Subject Matter Code MISC

Miscellaneous Comment

Author Name Marilyn Booth

Organization Conectiv

The rule proposes requirements that have significant economic, technological, and operational impacts on new facilities, without a corresponding benefit to the environment, or adequate consideration of the site-specific factors in determining impacts due to impingement and entrainment.

In developing the proposed rule, Conectiv feels that EPA has failed to adequately and accurately consider many important issues, such as:

* the number of facilities the rule would impact;

* the cost of performing the baseline biological characterization of the source waterbody (required prior to permitting a new facility), and the additional lead time that would be required to pern1it a new facility as a result of this requirement;

* the failure to define adverse environmental impact;

* the need for consideration of site-specific factors in evaluating impacts and intake technologies;

* the use of the littoral zone to define sensitive areas, and

* the economic impact and resulting environmental benefit of proposed rule.

EPA Response

The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I establishes specific requirements for a suite of technologies that would represent best technology available for minimizing adverse environmental impact. However, under Track II, an applicant has the opportunity to conduct site-specific studies to demonstrate that alternative technologies or configurations, including the relocation of an intake, will reduce impingement and entrainment to a level of reduction comparable to the level achieved if the facility implemented the Track I technology-based performance requirements.

EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today’s rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important

elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.).

In response to comments received, concerning the costs and benefits of the proposed rule, EPA has conducted some additional research. EPA has gathered additional cost information to verify its cost estimates. It has collected additional information on benefit or the efficacy of the technologies used in the costing exercise. EPA has used more recent forecasts to estimate the number of electric generation facilities that would be impact by the rule. EPA considered the costs and benefits of a number of alternatives to the requirements in today's final rule.

EPA has adopted an alternative regulatory structure from proposal and will not in this rule set a nationally defined littoral zone to define sensitive areas. In addition, the final rule eliminates the requirement under Track I to perform a baseline biological source water sampling prior to the applicant submitting an application for a permit. Under Track II, the applicant is required to perform and submit to the Director the results of a Comprehensive Demonstration Study which includes a Source Water Biological Study. The cost of performing the Source Water Biological Study is fully articulated in the information collection request for this rule.

Comment ID 316bNFR.203.002

Subject Matter Code 10.01

Regulatory Framework Options

Author Name Marilyn Booth

Organization Conectiv

In addition, EPA in its attempt to reduce the burden on permit writers by providing a "cookie cutter" approach to determining Best Technology Available, has proposed rather arbitrary criteria for decision making which have no scientific basis, including:

* applicability of 2 mgd flow threshold;

* specification of a 0.5 ft/sec through-screen velocity cap;

* for freshwater rivers and streams, the proposal that intake flow be no more than the lower of 5% of the source waterbody mean annual flow or 25% of the 7Q10;

* 99% "level of protection";

* for estuaries and tidal rivers, the proposal to limit total design intake flow to less than 1 percent of the volume of the water column;

* defining cooling water intake structures to include structures that withdraw water at least 25% of which is used for cooling;

* imposition of flow limits within 50 meters of littoral zones.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.203.003

Author Name Marilyn Booth

Organization Conectiv

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

These issues, and others, are discussed fully in the comments that are being submitted by UWAG and EPRI on behalf of their members. Conectiv urges EPA to fully consider those comments in the development of the final rule. Use of a more site-specific approach to the determination of cooling water intake structure impacts and the best technology required to minimize (not eliminate) those impacts will enable state regulatory agencies and their permit writers to make the best decisions regarding protection of the water bodies for which they are most knowledgeable.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Peter S. Duncan

On Behalf Of:

New York State Dept. of Environmental Conservation

Author ID Number:

316bNFR.204

Comment ID 316bNFR.204.001

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 10.01

Regulatory Framework Options

A primary concern of NYSDEC is that the final regulations set national standards of sufficient stringency to ensure "a level playing field" between the states. The State of New York has very strong standards for ensuring that the waters of this state achieve the goals of the Clean Water Act. NYSDEC supports nationwide application of the concept of minimum technology requirements for use in section 316(b) determinations. Such technology requirements may include, for example, maximum velocity limitations, capacity requirements and screening requirements. NYSDEC supports maximum velocity limitations combined with exclusionary screens, as a means of reducing fish mortality.

EPA Response

See response to 316bNFR.073.001.

Comment ID 316bNFR.204.002

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 12.4

Requirement to Reduce Flow to Level Commensurate with Closed-cycle Facility

NYSDEC also supports a minimum flow standard commensurate with closed cycle cooling. There are several existing and demonstrated closed cycle cooling technologies that dramatically reduce environmental impacts from once-through cooling. Indeed, dry cooling tower technology is successfully in use in several states and has been required of a proposed facility in New York that has received all of its State approvals. See, Matter of Athens Generating Company, LP, Interim Decision of the Commissioner, June 2, 2000. Currently, from among the cooling tower technologies, dry towers provide the greatest protection to the aquatic resource. However, NYSDEC recommends that permit writers have the flexibility to allow alternate cooling tower technologies or other technologies which minimize adverse environmental impact to a degree equivalent to that achieved by dry cooling.

EPA Response

EPA agrees that closed-cycle cooling is the best technology available for minimizing impingement and entrainment. However, EPA notes that it considers closed-cycle recirculating wet cooling to be preferable to the dry cooling option also mentioned by the commenter. EPA disagrees that dry cooling is the appropriate selection as the best technology available to minimize impingement and entrainment for the reasons explained in section V of the preamble to the rule. See response to comment #316bNFR.206.014.

Comment ID 316bNFR.204.003

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 125.85

Alternative Requirements

NYSDEC supports allowing permit writers to deviate from the dry cooling or equivalent standard under circumstances as set forth in proposed 40 CFR § 125.85. This type of provision is desirable to ensure that the higher standard does not inadvertently discourage the siting of new, cleaner and more efficient electric generating facilities. NYSDEC supports the replacement of old, dirtier facilities with such modern facilities. However, NYSDEC recognizes that the necessary infrastructure, including electric transmission lines and gas supply lines, impose some limitations on locations suitable for new or upgraded facilities which may not be present for other industry sectors. In such cases, compliance with the standard might result in costs wholly out of proportion to the costs considered by EPA in the proposed regulations. Consequently, in these cases, a different standard may have to be allowed in order to provide vital electric supplies.

EPA Response

EPA has not included a standard commensurate with that which can be achieved through dry cooling technology in today's rule. However, EPA has included a standard that is commensurate with that which can be achieved by a closed-cycle recirculating cooling water system. Furthermore, EPA included the alternative requirements provision of 125.85 in case a new facility would have compliance costs for a requirement at issue wholly out of proportion to the costs EPA considered for the requirement at issue in developing this rule. EPA supports the commenter's position that cleaner and more efficient facilities should be encouraged and believes that today's rule allows that. See preamble section VII.H for further discussion on the alternative requirements provision.

Comment ID 316bNFR.204.004

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 15.11

Mandatory Approaches

NYSDEC supports the mandatory restoration approach (as described in 6.a.), but for all waters not just estuarine or littoral zone waters. This approach mitigates any adverse environmental impacts that would remain after applying all other techniques for mitigating the location, design, construction and capacity of the intake structure. NYSDEC recommends addressing impacts in the following hierarchy:

1) Avoid a negative impact to the extent practicable.
2) For those negative impacts that can't be avoided, minimize them to the extent practicable.
3) For the residual negative impact that can't be avoided or minimized, seek compensation, (replacement of function) in the following order of ranking:
   a) In-kind, on site or as close as possible (same watershed).
   b) In-kind, off-site.
   c) Out-of-kind, on site or as close as possible (same watershed).
   d) Out-of-kind, off site.

The benefits of mandatory restoration should be balanced in each case against its costs and any resulting adverse environmental impacts.

EPA Response

See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II. EPA has not adopted the mandatory restoration measures in the proposed rule because EPA believes that the requirements in the rule represent BTA for minimizing adverse environmental impact. States may always be more stringent than federal law under section 510 of the CWA.

Comment ID 316bNFR.204.005

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 10.03

Additional Littoral Zone Requirements

NYSDEC recommends that EPA extend the level of protection proposed for the "littoral zone" to each of the water body types listed. Lesser degrees of protection for waters outside of the littoral zone may compromise the State's ability to protect against avoidable mortality of aquatic organisms in such waters. NYSDEC staff has concluded the environmental impacts of an unmitigated cooling water intake structure may be significant, even in waters outside of the littoral zone.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

EPA decided (for the new facility rule) that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the Track I requirements are technically available and economically practicable for new facilities, and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce impingement and entrainment using different technologies.

Comment ID 316bNFR.204.006

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

EPA's proposed definition of "cooling water intake structure" is inadequate. For example, it is unclear whether such definition includes the pumps that withdraw the water and which cause much of the impingement and entrainment mortality. Thus, NYSDEC recommends that the definition be clarified to expressly include pumps.

EPA Response

EPA agrees. In the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the intake pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed.

Comment ID 316bNFR.204.007

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 9.4

Adverse Environmental Impact

NYSDEC recommends that EPA include a definition of "minimize adverse environmental impact" which protects the best uses of the concerned water body. Such definition should ensure that mitigation measures are required consistent with applicable state law and regulation, and to restore and maintain the chemical, physical and biological integrity of the waters of the state, pursuant to the Clean Water Act. Furthermore, any definition of "environmental impact" should provide that non-aquatic impacts be considered consistent with state law and regulations.

EPA Response

Please see response to comment 316bNFR.501.003.

Comment ID 316bNFR.204.008

Subject Matter Code MISC

Miscellaneous Comment

Author Name Peter S. Duncan

Organization New York State Dept. of Environmental Conservation

As a practical matter, the regulations should clarify the State's responsibilities for the period between the effective date of the final rule and the date when any necessary changes to the State's SPDES program are formalized. Specifically, the regulations should provide that the State is authorized to continue issuance of SPDES permits pursuant to it's existing federal delegation. The regulations should further provide that the State can implement any provisions established in the final rule.

EPA Response

EPA disagrees that State should be authorized to continue issuance of State NPDES permits pursuant to it's existing federal delegation. A State or Tribe authorized to implement the NPDES program must implement new Federal regulatory requirements upon following promulgation of the final regulations. The requirements must be implemented upon permit issuance and reissuance.

Under 40 CFR 123.62(e), any existing approved section 402 permitting program must be revised to be consistent with new program requirements within one year from the date of promulgation, unless the NPDES-authorized State or Tribe must amend or enact a statute to make the required revisions. If a State or Tribe must amend or enact a statute to conform with today's final rule, the revision must be made within two years of promulgation. States and Tribes seeking new EPA authorization to implement the NPDES program must comply with the requirements when authorization is requested.

EPA also disagrees that a State should be allowed to implement any provisions established in the final rule. A State authorized to implement the NPDES program must generally include requirements that are as stringent as Federal program requirements. However, States retain the ability to implement requirements that are broader in scope or more stringent than Federal requirements. (See section 510 of the CWA)

Comment ID 316bNFR.204.009

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code SUP

General Statement of Support

Such proposed regulations are important to the State of New York as a substantial number of applications to site new facilities in New York State are currently being processed. Such regulations, if promulgated, will represent the first comprehensive and authoritative guidance form the Environmental Protection Agency (EPA) as to the standard for, and application of, best technology available under the Clean Water Act.

EPA Response

No response necessary.

Comment ID 316bNFR.204.010

Author Name	Peter S. Duncan
Organization	New York State Dept. of Environmental Conservation

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

It is also fundamental to the Clean Water Act that the best uses of the water body are protected. However, many of the proposed alternatives are inconsistent with the technology-based standards of Sections 301, 304, and 306 of the Clean Water Act (33 USC 1311, 1314, 1316). New York for a long time has used the approach EPA cites as "a third alternative" on the last paragraph on page 49074, and we recommend that approach to the EPA.

EPA Response

Please see response to comment 316bNFR.029.013 for EPA's interpretation of AEI under today's rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William A. Anderson, II

On Behalf Of:

Winston & Strawn

Author ID Number:

316bNFR.205

Comment ID 316bNFR.205.001

Author Name William A. Anderson, II

Organization Winston & Strawn

Subject Matter Code 10.13

Request for Comment: Uniform Set of Standards Applicable to All Facilities

One is its extensive examination of the legislative history of the Federal Water Pollution Control Act Amendments of 1972, which contains scant support for making Section 316(b) the basis of uniform national standards.

EPA Response

See 316bNFR.068.007, 068.008, 206.014 for an explanation of EPA's interpretation of 316(b) as supporting a technology-based approach.

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.010. Thus, although the rule establishes uniform technology-based performance standards, it does not dictate a single, uniform approach regarding compliance. Rather, the final rule provides flexibility that allows new facilities to address differences within and between water body categories, while ensuring a level of performance based on best technology available to minimize adverse environmental impact.

The second is its recollection of the often-overlooked interpretation by EPA of Section 316(b) that was contemporaneous with its enactment. The Agency's initial understanding of that section at the time it was adopted, reflected in its original draft Development Document and proposed regulations, was that it did not authorize, either directly or indirectly, imposition of closed-cycle cooling. That understanding, I believe, provides a window on Congress's expectation and intent, as well.

EPA Response

It is well established that agencies may change their interpretation of statutes they administer, and that where a statute is silent or ambiguous as to its intent, Courts will uphold a reasonable interpretation of a statute. Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 838, 843 (1984) (Chevron dealt with a Clean Air Act regulation where EPA changed its interpretation of the term "stationary source" as used in the CAA Amendments of 1977. Under the CAA, EPA could require states to institute programs obligating pollution-emitting facilities to get approval whenever a modification to a 'stationary source' would increase that sources total emissions. EPA revised the interpretation so that an entire plant, rather than each individual piece of pollution-emitting equipment, counted as a "stationary source.") There, the Court stated:

When a Court reviews an agency's construction of the statute which it administers, it is confronted with two questions. First, as always, is the question whether Congress has directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress. If, however, the court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute, as would be necessary in the absence of administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute." . . . fn "The court need not conclude that the agency construction was the only one it permissibly could have adopted to uphold the construction, or even the reading the court would have reached if the question initially had arisen in a judicial proceeding. Thus, if a statute is ambiguous and an agency's interpretation of the statute is reasonable, a court must defer to the agency even if, in the court's view, the agency is wrong."

See also Amax Land Company v. Quarterman, 181 F.3d 1356, 1365 (D.C. Cir. 1999) where the D.C. Circuit recently reviewed the cases regarding a change of interpretation and found that a changed interpretation would not defeat Chevron deference, . . . but would under Motor Vehicle Mfrs. Ass'n of United States, Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 46-57, require the agency to provide a reasoned explanation for its changed interpretation, see Smiley v. Citibank, N.A. 517 U.S. 735, 742 (1996). See also Christensen v Harris County, 529 U.S. 576, 587 (2000), affording Chevron deference to agency interpretations promulgated through notice and comment rulemaking or formal adjudication.

EPA has, at least since its General Counsel's opinion of 1976, interpreted section 316(b) to authorize EPA to establish performance-based technology requirements on the dynamic flow of the cooling water intake structure that reduce impingement and entrainment at a level that is achieved by using closed-cycle cooling. Section 316(b) authorizes EPA to impose limitations on the location, design, construction and capacity of CWISs. EPA interprets the statute to authorize it to regulate that volume of the flow of water withdrawn through a cooling water intake structure as a means of addressing "capacity." In re Brunswick Steam Electric Plant, Decision of the General Counsel No. 41 (June 1, 1976). Such limitations on the volume of flow are consistent with the dictionary definition of "capacity", the legislative history of the Clean Water Act, and the 1976 regulations. Id. Indeed, as Decision of the General Counsel No. 41 points out, the major environmental impacts of cooling water intake structures are those affecting aquatic organisms living in the volumes of water withdrawn through the intake structure. Therefore, regulation of the volume of the flow of water withdrawn also advances the objectives of section 316(b). EPA believes that this interpretation is reasonable and should be afforded deference.

Comment ID 316bNFR.205.003

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name William A. Anderson, II

Organization Winston & Strawn

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

David K. Gordon & Reed W. Super

On Behalf Of:

Riverkeeper, et al.

Author ID Number:

316bNFR.206

Note

Comments replaced 316bNFR.032 and 055. Attachments received with 032 coded as 316bNFR206, beginning with comment number 101.

Comment ID 316bNFR.206.001

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Subject Matter Code OPP

General Statement of Opposition

After nearly 27 years of illegal inaction<FN 2>, EPA's Proposed Regulation for cooling water intake structures at new facilities would violate the Clean Water Act and represents unsound environmental policy.

Footnotes

2 Section 316(b) requires regulations addressing cooling water intake structures within the mandatory time limits of Sections 301 and 306, which for new facilities was January 18, 1974. 33 U.S.C. § 1326(b); 33 U.S.C. § 1316(b)(1)(A), (B).

EPA Response

No Response Necessary.

Comment ID 316bNFR.206.002

Subject Matter Code	9.1
Overview of Current Situation of AEI	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

COOLING WATER INTAKE STRUCTURES AND THEIR ENORMOUS IMPACTS ON FISH AND AQUATIC LIFE.

Cooling water intake structures kill fish in staggering numbers. Every year, electric generating and industrial facilities take in 70 trillion gallons of U.S. waters for cooling, <FN 3> and in the process kill trillions of fish, shellfish, plankton, and other aquatic organisms at all life stages: eggs, larvae, juveniles and adults. This excessive mortality occurs both despite and as result of the facilities' attempts to filter out "foreign matter" from the cooling water intake process. Aquatic organisms too small to be screened out are drawn through a plant's cooling system and are killed by "entrainment."<FN 4> Larger organisms become trapped on intake screens and are killed or injured by "impingement." <FN 5>

The magnitude of fish deaths through impingement and entrainment is extremely high. While data on fish mortality from cooling water intake structures (abbreviated as "CWISs") is far from comprehensive and most likely understates impacts, massive fish kills by electric generating facilities have been documented for quite some time in the U.S. and Europe. More than 24 years ago EPA released a document reporting studies from the late 1960s and early 1970s which demonstrated that a single power plant can kill millions of fish in a very short period of time. As just a few examples of extensive entrainment deaths:

* Between 7 million and 164.5 million menhaden and river herring were killed each day in the summer of 1971 by entrainment at the Brayton Point Station in Somerset, Massachusetts on Mt. Hope Bay, in the northeastern reach of Narragansett Bay;

* 36 million menhaden and blueback herring were killed by entrainment during a sixteen day period in 1972 at the Millstone Point Nuclear Power Station on Niantic Bay in Waterford Connecticut; and

* 179 million fish larvae were killed per year from 1969- 70 at the Connecticut Yankee Plant on the Connecticut River in Haddam Neck, Connecticut.<FN 6>

The same EPA document also reported enormous impingement death tolls at power plants, such as:

* 6 million river herring were destroyed by impingement from October-December, 1972 by the Surry Power Station on the James River, Virginia;

* More than 2 million fish were killed during the late summer and early fall of 1971 by the Millstone Point Plant's intake screens on Niantic Bay;

* 1.3 million white perch and striped bass were killed by the Indian Point Electric Generating Station on Haverstraw Bay on the Hudson River in Buchanan, New York during one 9-1/2 week period from 1969-1970, with a predicted impingement death toll of 6.5 million fish per year; and

* 7, 191,785 menhaden, anchovy and croaker were impinged in one year by a power plant in Galveston Bay, Texas (P .H. Robinson Plant, 1969- 70).<FN 7>

The Salem Nuclear Generating Station, located in Salem County, New Jersey, approximately 50 miles northwest of Delaware Bay and 30 miles southwest of Philadelphia, uses more than 3 billion gallons of cooling water each day. A study commissioned by the New Jersey Department of Environmental Protection estimated that 842,000,000 bay anchovy, 1,120,000 weakfish, 375,000 white perch, 281,746 herrings (alewife & blueback), 305,000 spot, 61,100 Atlantic croaker, and 3,239 striped bass are killed annually by cooling water intake structures at the Salem plant. <FN 8 > In fact, the Salem intakes kill four times as many bay anchovy and weakfish each year than are caught by commercial fishing in the Delaware Estuary. <FN 9>

In the preamble to the Proposed Regulation EPA reported more recent documented case studies of the devastating impacts associated with impingement and entrainment at individual steam electric generating facilities, such as the following:

At the Brayton Point plant in Mt. Hope Bay:

* Annual entrainment averages 4.9 billion tautog eggs, 860 million windowpane eggs, and 890 million winter flounder larvae each year;

* In 1994, 30,885 pounds of adult tautog, 20,146 pounds of windowpane, and 96,507 pounds of winter flounder eggs and larvae were killed by entrainment; and

* Mt. Hope Bay experienced a progressively steady rate of decline (up to an 87 percent reduction) in finfish species of recreational, commercial, and ecological importance as a result of the Brayton Point plant's cooling water intakes. <FN 10>

At the San Onofre Nuclear Generating Station on the Southern California coast:

* In a normal (non-El Nino) year, 110 tons of midwater fish are entrained, and at least 41 percent are killed during plant passage. The fish killed include approximately 350,000 juveniles of white croaker, a popular sport fish, as well as northern anchovy and queenfish;<FN 11>

* Within 3 kilometers of the plant, the density of queenfish and white croaker in shallow-water samples decreased by 34 and 63 percent, respectively. Queenfish declined by 50 to 70 percent in deepwater samples; <FN 12>

* Cooling water intakes reduced kelp beds by 60 percent (80-hectares), resulting in a 70 percent decline in abundance for kelp-associated fish communities. Other fish living in the impacted water column had a 17 percent loss in abundance and a 33 percent decline in biomass compared to control populations. Many species of large invertebrates in kelp beds, particularly snails, also declined; <FN 13> and

* San Onofre studies also indicated that withdrawal of cooling water increased turbidity, causing poor

survival rates and lack of development of early life stages essential to the replenishment of adult fish populations. <FN 14>

At the Brunswick Nuclear Steam Electric Generating Plant in North Carolina

* 3 billion to 4 billion larvae and postlarvae are killed per year; and

* Modeling of entrainment mortality on the population of selected species in the Cape Fear estuarine system predicted a 15 to 35 percent reduction in the species' population. <FN 15>

On the Hudson River in New York, entrainment studies of five power plants (Indian Point, Bowline, Roseton, Lovett and Danskammer) predicted year-class reductions of up to 79 percent, depending on fish species. <FN 16>

At the D.C. Cook Nuclear Power Plant in Michigan, I million fish were killed during a 3- week study period.<FN 17>

At the Crystal River Power Plant in Florida, 23 tons of fish and shellfish of recreational, commercial, or forage value are lost each year. <FN 18>

The Pittsburg and Contra Costa Plants in the San Francisco Bay Delta in northern California impinge and entrain threatened delta smelt and endangered runs of Chinook salmon and steelhead trout.<FN 19>

Additionally, EPA is aware of a plant where more than 1,300 endangered sea turtles entered enclosed cooling water intake structure canals, resulting in some mortality over a 9-year period.<FN 20>

EPA also has placed in the docket for the Proposed Regulation numerous other studies of fish mortality by entrainment and impingement at cooling water intake structures. These studies include studies of particular water types (Inland Waters; Estuaries; and Coastal Waters), studies of particular regions or states (Michigan; Southwest U.S.; New York State), studies of particular waters (Lake Erie; Kanawha River; Great Lakes; Western Great Lakes; Lake Michigan; New River; Wabash River; Ohio River; Chesapeake Bay; Hudson River), and studies of particular power plants (Clifty Creek Station; Tanners Creek Power Plant; Bowline Point; Zion Nuclear Generating Station; Cardinal Plant; Kyger Creek Station; Gallatin Steam Plant), among others. <FN 21>

In all, EPA currently has a database of impingement and entrainment data from 98 different facilities, ranging from the relatively small Palisades Plant in Michigan, which takes in 19.7 million gallons per day (mgd), to the nation's largest user of cooling water, the Salem Nuclear Plant in New Jersey which withdraws more than 3 billion gallons per day.<FN 22> Industry conducted the vast majority of these studies, and even the massive reported death tolls fail to account for the full extent of mortality to aquatic organisms. Indeed, EPA acknowledges that fish mortality at power plants and other facilities is far more extensive and severe than has been documented:

Existing and historical studies. ..provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. Most important, the methodologies for evaluating

adverse environmental impact used in the 1970s and 1980s, when most section 316(b) evaluations were performed, were often inconsistent and incomplete. For example, some studies reported only gross fish losses; others reported fish losses based on species and life stage; still others reported percent losses of the associated population or subpopulation (e.g., young-of-year fish). <FN 23>

What is incontrovertible, however, is that EPA must address the extensive aquatic mortality caused by cooling water intakes which represents a significant adverse environmental impact.

Footnotes

3 65 Fed. Reg. at 49071 (August 10, 2000); see also Rabago, What Comes Out Must Go In: Cooling Water Intakes and The Clean Water Act, Harvard Environmental Law Review, Vol. 16, No.2, 1992, p. 429, citing Edison Elec. Inst., Environmental Directory of u.s. Power Plants at 1-1 to 1-345 (1991).

4 Entrainment occurs when relatively small fish and shellfish organisms, eggs, and larvae are drawn through the cooling water intake structure into the plant's cooling system, pass through its heat exchanger, and are discharged out of the facility .As entrained organisms pass through the cooling system they are subject to mechanical, thermal, and toxic stress including physical impacts in the pumps and condenser tubing, pressure changes caused by diversion of the cooling water into the plant or by the hydraulic effects of the condensers, sheer stress, thermal shock in the condenser and discharge tunnel, and chemical toxemia induced by antifouling agents such as chlorine. Few, if any, entrained organisms survive. 65 Fed. Reg. at 49072; see also u.s. EPA, Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b), P.L. 92-500, p. I (1977) (hereinafter "1977 EPA Guidance Manual").

5 Impingement occurs when fish and other aquatic organisms become trapped on screening devices or other barriers installed at the entrance of the intake structure to prevent debris from entering the facility's cooling system. Impingement is caused by the force of water passing through the intake structure and can result in starvation and exhaustion (when organisms are trapped against an intake screen), asphyxiation (when organisms are forced against an intake screen or other barrier at the entrance to the cooling water intake structure by velocity forces that prevent proper gill movement or when organisms are removed from the water for prolonged periods of time), and descaling (when organisms are removed from an intake screen by a wash system). 65 Fed. Reg. at 49072; see also 1977 EPA Guidance Manual, p. I.

6 U.S. EPA, Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact (April, 1976) (hereinafter, "1976 EPA Development Document"), at p. 9, Table 1-3; see also Ravage, supra note I, at pp. 429- 430, citing Clark & Brownwell, Electric Power Plants in the Coastal Zone: Environmental Issues (American Littoral Society Special Publication No.7, 1973), at p. V-8, Table V-B.

7 1976 EPA Development Document, p. 7, Table 1-2

8 Versar, Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Salem Nuclear Generating Station, § VI-4 (Jan. 1989) (Revised Final Report) (reported on an "equivalent adult" basis).

9 Id. 30 million pounds of bay anchovy and weakfish are lost each year due to entrainment and impingement at Salem compared to 6.8 million pounds of yearly commercial landings between 1975-1980.

10 65 Fed. Reg. at 49073, citing Gibson (1996).

11 65 F ed. Reg. at 49073, citing S. Swarbrick and R.F. Ambrose (1988).

12 65 Fed. Reg. at 49073, citing S. Swarbrick and R.F. Ambrose (1989).

13 65 Fed. Reg. at 49073, citing MRC (1989).

14 Id.

15 65 Fed. Reg. at 49073, citing EPA Region IV (1979).

16 65 Fed. Reg. at 49073, citing John Boreman and Phillip Goodyear, Estimates of Entrainment Mortality for Striped Bass and Other Fish Species Inhabiting the Hudson River Estuary, American Fisheries Society Monograph 4: 152-160, 1988.

17 65 Fed. Reg. at 49073, citing Thurber and Jude (1985).

18 65 Fed. Reg. at 49073, citing EPA Region IV (1986).

19 65 Fed. Reg. at 49072

20 65 F ed. Reg. at 49072

21 See US EPA, Clean Water Act 316(b) New Facility Preamble and Proposed Rule. Record Index -Benefits Analysis (August 10, 2000).

22 US EPA, Facilities for Which EPA Has Impingement and Entrainment Data (undated 3-page table).

23 65 Fed. Reg. at 49073-49074. EPA will be conducting a small number of "facility studies" and "watershed studies," in which it will analyze industry's methods, protocols, and assumptions in order to arrive at its own conclusions.

EPA Response

EPA is aware of the impacts associated with cooling water intakes and the Agency's obligation to develop a regulation to address this matter. For additional discussion refer to section II (Legal Authority) and section III (Environmental Impact Associated With Cooling Water Intake Structures) of the Preamble.

Comment ID 316bNFR.206.003

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Subject Matter Code 2.2

Obligation Under 316(b)

CLEAN WATER ACT SECTION 316(B) REQUIRES TECHNOLOGY -BASED STANDARDS FOR COOLING W A TER INTAKE STRUCTURES.

Recognizing the significance of massive fish kills by impingement and entrainment at cooling water intake structures in waters of the U.S., Congress included Section 316(b) in the 1972 Federal Water Pollution Control Act amendments ("Clean Water Act," "CWA " or the " Act"). <FN 24> Section 316(b) provides:

Cooling water intake structures

Any standard established pursuant to [Section 301 or Section 306 of the Act] and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. <FN 25>

The structure of the Clean Water Act indicates how Congress intended the section 316(b) "best technology available" requirements to be implemented. The Clean Water Act prohibits all discharges of pollutants to waters of the U.S. except as permitted in a National Pollutant Discharge Elimination System (NPDES) permit.<FN 26> NPDES permits contain, among other things, two different sets of limitations: technology-based and water quality-based limitations. EPA establishes industry-wide, nationally-uniform, technology-based control standards, without regard to site-specific water parameters (such as receiving water quality) to govern the setting of individual NPDES permit limitations.<FN 27> Once established by EPA, these national, technology-based standards must be incorporated into every individual NPDES permit issued nationwide. The goals of technology-based standards are to bring all plants up to state-of-the-art pollution control as quickly as possible (sometimes referred to as "technology forcing") and to ensure national consistency in NPDES permit limitations. <FN 28>

Conversely, water quality-based limitations are set to prevent a discharge from violating ambient standards that states establish to define baseline water quality. They may be more stringent than technology-based standards if necessary to ensure that a discharge complies with ambient water quality standards and use requirements.

CWA sections 301 and 306 are the provisions of the Act that require EPA to establish, by specified dates, national technology-based limitations for each industrial category. Section 301 requires EPA to promulgate effluent limitations (e.g., limits on chemical pollutants) for existing facilities, and Section 306 requires EPA to promulgate standards of performance for new facilities. Section 316(b)'s explicit cross-reference to sections 301 and 306 makes cooling water intake standards an integral component of the NPDES technology-based regulations. This integration, along with the spare and direct "best technology available" mandate, clearly indicates Congressional intent that EPA set nationwide technology-based standards for cooling water intake structures in the same fashion as for chemical pollutants.

Section 301 mandates the "best available technology" for existing sources while the section 306 new source performance standard must reflect the "best available demonstrated control technology." Congress' use of substantially similar statutory language in Section 316(b) underscores its intent to incorporate that section 's limitations into the categorical standards of sections 301 and 306. Indeed, the United States Court of Appeals for the Fourth Circuit in Virginia Electric and Power Company ("VEPCO") v. Costle recognized that the statutory language and cross-referencing renders 316(b) standards essentially an adjunct to section 301 and 306 technology standards:

§ 316(b) itself seems to indicate its limitations are to be adopted under §§ 301 and 306. ...[W]e think that a regulation implementing the requirements of § 316(b) must qualify as an "other limitation"<FN 29> [under § 301 or § 306] [T]he regulations issued under § 316(b) are ...closely related to the effluent limitations and new source performance standards of §§ 301 and 306... It bears emphasis that § 316(b) ...requires § 301 and § 306 standards to deal with coo ling water intake structures. ...[The] regulations [are] issued at least in part under the same statutory sections, some of which limit intake structures, others, effluent discharges.<FN 30>

Based on that analysis, the VEPCO court held that that cooling water intake standards established by EPA under Sections 316(b), 301 and 306 are so closely tied to effluent limitations established under Sections 301 and 306 that they should be judicially reviewed in the same manner. <FN 31> Significantly, the court contrasted the similarity between Section 316(b) standards and effluent limitations with the fundamentally different statutory scheme for water quality standards. <FN 32>

In considering "the identical issue, namely, the relationship between section 316(b) and sections 301 and 306," the United States District Court for the Southern District of New York has concurred with the VEPCO holding that "the issuance of a regulation under section 316(b) constitutes the issuance of an 'other limitation' under sections 301 and 306."<FN 33> Consequently, the court held, section 316(b) creates a mandatory, enforceable duty, governed by the time limits in Sections 301 and 306 (i.e. January 18, 1974), to promulgate standards for cooling water intake structures. <FN 34>

EPA may comply with its Section 316(b) mandate in one of two ways. One option is to implement Section 316(b) by including national performance standards for cooling water intake structures in each national, industry-specific Section 301 and 306 standard. The other option is to implement Section 316(b) with a free-standing, overarching regulation that would apply to all categories of point sources subject to Sections 301 and 306 that utilize cooling water intake structures. Either of these two options is permissible.<FN 35>

Footnotes

24 33 U.S.C. §§ 1251-1387.

25 33 U.S.C. § 1326(b). On Section 316(b), see Rabago, What Comes Out Must Go In: Cooling Water Intakes and The Clean Water Act, Harvard Environmental Law Review, Vol. 16, No.2, 1992, pp. 429-505, and May & van Rossurn, The Quick and the Dead: Fish Entrainment, Entrapment and the Application of Section J16(b) of the Clean Water Act, Vermont Law Review, Vol. 20, No.2, Winter 1995, pp. 373-493.

26 CWA § 301(a); see also CWA § 402 (NPDES program).

27 See 40 C.F.R Parts 402-699.

28 A primary objective of Congress in implementing nationally applicable standards was to avoid the "race to the bottom," which commonly occurred in the absence of uniform national effluent limitations prior to the adoption of the Act, where states would compete to attract and maintain industries by relaxing control requirements. See Hines, Controlling Industrial Water Pollution: Color the Problem Green. 9 B.C. Indus. and Comrn. L. Rev. 553,573 (1968); Grad, Treatise on Environmental/ Law, v.2, § 303[a-1].

29 The reference to "other limitation" comes from CWA § 509(b)(1) which provides for jurisdiction in the circuit courts to review EPA 's action in promulgating any "effluent limitation or other limitation" under section 30 I, section 306, and other sections of the Act. 33 U.S.C. § 1369(b)(1).

30 Virginia Electric and Power Company v. Costle. 566 F.2d 446,450 (4th Cir. 1977); see also Cronin v. Browner, 898 F .Supp. 1052, 1059 (S.D.N. Y. 1995) ("the VEPCO court focused on whether a section 316(b) regulation should be considered a form of limitation under sections 301 and 306").

31 VEPCO, 566 F.2d at 450.

32 Id.

33 Cronin v. Browner, 898 F.Supp. at 1059.

34 Id. We recognize that the electric generating industry has argued that cooling water intake structures should be regulated under Section 316(b) in a manner similar to the variance provision for thermal pollution under Section 316(a), rather than in the same manner as pollutant discharges under Sections 301 and 306. However, such argument is based on the legislative history of Section 316(a), not Section 316(b). Moreover, it ignores: the VEPCO and Cronin v. Browner analyses, the cross-referencing between the relevant sections, the similarity amongst the BTA, BA T and BADCT standards, the obvious textual differences between sections 316(a) and 316(b), and the very different functions that Sections 316(a) and 316(b) fulfill -the former being a variance, and the latter, a technology-standard. See Seacoast Anti-Pollution League v. Cost/e, 572 F .2d 872,875, n.4 (unlike Section 316(b), Section 316(a) does not require EPA to promulgate a rule, but rather to issue an order).

35 Cronin v. Browner, 898 F.Supp. at 1060.

EPA Response

EPA agrees that CWA section 316(b) may be interpreted to authorize a primarily technology-based approach. See the preamble to the final rule and responses to comments, e.g., 316bNFR068.007; 316bNFR068.008

Comment ID 316bNFR.206.004

Subject Matter Code	2.3
Legal/Regulatory History	

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Organization Riverkeeper, et al.

REGULATORY HISTORY OF COOLING WATER INTAKE STRUCTURES.

EPA has established effluent limitations under CWA Section 306 for new sources in each of the industry categories which are major users of cooling water.<FN 36> However, none of these standards address cooling water intake structures.

In 1976, EPA chose to promulgate a single regulation under Clean Water Act section 316(b), codified at 40 C.F .R. Part 402 <FN 37> and applicable to all categories of point sources, rather than include a section 316(b) provision within all individual effluent limitations guidelines and new source performance standards under sections 301 and 306.

The operative section of the 1976 regulation, provided in full:

The information contained in the Development Document<FN 38> shall be considered in determining whether the location, design, construction and capacity of a cooling water intake structure of a point source subject to standards established under section 301 or 306 reflect the best technology available for minimizing adverse environmental impact. <FN 39>

In 1977, the United States Court of Appeals for the Fourth Circuit remanded the regulation back to EPA because EPA had violated the Administrative Procedure Act by failing to either publish the Development Document in the Federal Register or properly incorporate it by reference.<FN 40> As a result, the court did not address the validity of the regulation on substantive grounds. EPA subsequently withdrew the regulation,<FN 41> and has not promulgated or proposed a new cooling water intake structure regulation until its issuance of the present proposal.

On January 19, 1993, Riverkeeper, Inc.<FN 42> and a coalition of individuals and environmental organizations sued EPA in the United States District Court for the Southern District of New York, to obtain an order directing EPA to promulgate new cooling water intake regulations. Riverkeeper v. Browner, U.S.D.C., S.D.N. Y., Case No. 93 Civ 0314 (AGS).<FN 43> In 1995, plaintiffs and EPA agreed to a consent decree which among other things set forth a timetable by which EPA would take final action on regulations to implement Section 316(b). <FN 44>

Under the consent decree entered by the court in 1995, EPA was required to propose regulations implementing Section 316(b) no later than July 2, 1999, and to take final action with respect to the regulations no later than August 13, 2001. EPA subsequently moved to amend the Consent Decree, claiming it was unable to meet the deadlines.<FN 45> Although the court found that EPA's "explanations for its previous delays do not justify modification of the Consent Decree," it extended the proposal deadline, on the ground that "the public interest does require that the Decree be modified to enable EPA to produce a sound Regulation." <FN 46> At EPA's request the court bifurcated the required rulemaking into a Phase I regulation for new facilities and a Phase II regulation for existing facilities. Further, the Court ordered EPA to propose the Phase I regulation by July 20, 2000.<FN 47>

Footnotes

36 See, e.g., Steam and Electric Power Generating: 40 C.F.R. Part 423; Pulp, Paper and Paperboard: 40 C.F.R. Part 430, as amended 42 Fed. Reg. 13198 (January 6, 1977); Petroleum Refining: 40 C.F.R. Part 419.

37 Former 40 C.F.R. §§ 402.10-402.12 (1976)

38 USEPA, Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact, 1976.

39 Former 40 C.F.R. § 402.12 (1976). The remainder of the regulations contained a statement of scope and certain definitions. Former 40 C.F .R. §§ 402.10, 402.11 (1976). See VEPCO, 566 F .2d at 448.

40 Appalachian Power Co. v. Train. 566 F .2d 451 (4th Cir. 1977).

41 See 44 Fed. Reg. 32956 (June 7, 1979).

42 At that time, Riverkeeper was known as Hudson Riverkeeper Fund, Inc

43 The plaintiffs in the lawsuit are Riverkeeper, Inc., Alex Matthiessen, a/k/a The Hudson Riverkeeper; Maya K. van Rossum, a/k/a The Delaware Riverkeeper; Terrance E. Backer, a/k/a, The Soundkeeper; John Torgan, a/k/a the Narragansett Baykeeper; Joseph E. Payne, a/k/a The Casco BayKeeper; Jonathan Kaplan, a/k/a The San Francisco Baykeeper; Sue Joerger, a/k/a The Puget Soundkeeper, Steven E. Fleischli, a/k/a the Santa Monica BayKeeper, Andrew Willner, a/k/a The New York/New Jersey Baykeeper, The Long Island Soundkeeper Fund, Inc., the New York Coastal Fishermen's Association, Inc. and the American Littoral Society, Inc. The case was previously captioned as Cronin v Browner .

44 Fifty-six individual power companies and three power industry associations sought to intervene in the lawsuit. Judge Allen G. Schwartz denied the utilities' motion to intervene, finding that they had failed to meet the standards for either mandatory or permissive intervention under Federal Rules of Civil Procedure 24(a)(2) and 24(b). Cronin v. Browner, 898 F.Supp. at 1056-1057.

45 Cronin v. Browner, 90 F.Supp.2d 364,368 (S.D.N.Y. 2000).

46 Id. at 372

47 Id. at 376.

EPA Response

This excerpt from commenter's comment does not make any particular argument regarding the rule, but is merely the commenter's view of the history of section 316(b) of the Clean Water Act. The regulatory history of section 316(b) and legal basis for the final rule are presented in the preambles to the proposed and final rules.

Comment ID 316bNFR.206.005

Subject Matter Code	10.01
	Regulatory Framework Options

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EPA is proposing to establish BTA requirements based on an inaccurate, imprecise and subjective assessment of the relative ecological quality of waters.

None of the nine different sets of BTA requirements are sufficiently protective to minimize adverse environmental impact. On what EPA defines as waters outside of "Zones of Biological Concern,"<FN 48> the proposal would not include any capacity requirements. This would allow industries to continue to develop the most devastating, antiquated fish-killing technology, "once-through cooling" for use by new facilities. Once through-cooling at a single large plant can use billions of gallons of water per day and kill billions of fish. Even on water bodies defined by EPA as most-sensitive the Agency does not recognize dry-cooling as BTA, despite acknowledging its environmental benefits and increasingly common use in the U.S. By installing dry cooling systems, the vast majority of new facilities would have no need whatsoever for substantial withdrawals from waters of the United States, virtually eliminating fish mortality from cooling water intakes.

Footnotes

48 USEPA Section 316(b) Regulatory Development Project, "Definition for Zones of Biological Concern in Freshwater Rivers and Streams, Lakes, Reservoirs and Oceans," February 2000, DCN 1-5043-PR.

EPA Response

In the final rule, EPA is establishing capacity requirements in a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. The final rule does include intake capacity requirements - all new Track I facilities with cooling water intake structures must reduce the total design intake flow to a level, at a minimum, commensurate with that which can be attained by a closed-cycle recirculating cooling water system using minimized make-up and blowdown flows.

EPA rejects dry cooling as best technology available for a national requirement for reasons outlined under response to comment 316bNFR.006.001. Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities.

Under the final rule EPA will allow once-through cooling if the facility can meet the requirements commensurate with closed-cycle recirculating system. Some facilities may be located on huge waterbodies that are of low water quality and based on site-specific issues once-through system could be supported if the requirements of Section 125.84 are met.

Comment ID 316bNFR.206.006

Subject Matter Code 10.01

Regulatory Framework Options

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EPA's failure to require sufficiently protective technology is based in large part on relatively minor cost variations between the cooling system technologies. Even by EPA's own calculation, the incremental costs of a nationally-uniform rule requiring closed-cycle cooling are negligible. Likewise, the costs of investing in dry cooling are relatively minor compared to the overall construction costs and the expected revenues and profits for new plants. Indeed, many plants of many of sizes and in a variety of climates already use dry cooling, which is a technically feasible and affordable technology.

EPA Response

See response to comments 316bNFR.006.001 and 316bNFR.206.005.

Comment ID 316bNFR.206.007

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Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

EPA is requesting comment on a wide array of alternative approaches to establishing BTA limitations, many of which have been suggested by the electric generating industry. These case-by-case, site-specific, multi-tiered approaches contravene the Act's mandate for uniform, national standards and would significantly prejudice the efforts of state regulators and local officials and advocates, who - facing the extensive resources of the power industry - would be required to prove the need and reasonable cost of best technology in the permit proceeding for each new power plant.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. Hence, the rule puts in place uniform national performance requirements using either a fast-track or demonstration track approach. See response to 316bNFR.008.001.

Comment ID 316bNFR.206.008

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Subject Matter Code 2.2

Obligation Under 316(b)

THE 316(b) MANDATE REQUIRES MINIMIZATION OF INTAKE CAPACITY.

Section 3l6(b) of the Clean Water Act requires EPA to promulgate regulatory standards requiring that:

the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.<FN 49>

Because the amount of water withdrawn by an intake is a critical determinant of the extent of adverse environmental impact, <FN 50> the plain language of section 316(b) requires a minimization of intake capacity.

Footnotes

49 33 U.S.C. § 1326(b).

50 See Part II, Section A.2 infra.

EPA Response

EPA agrees that it has authority to regulate flow into the CWIS as a measure of capacity and flow into the CWIS as a proportion of the waterbody as a control on location and capacity. See the preamble to the final rule.

Comment ID 316bNFR.206.009

Subject Matter Code	10.0
Best Technology Available	

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Organization Riverkeeper, et al.

EPA Must Limit The Total Volume Of Water Withdrawn By Restricting Cooling Water Intake Capacity Wherever It Would Contribute To Minimization Of Adverse Environmental Impact.

The statute requires that CWIS "location, design, construction, and capacity reflect the best technology available for minimizing adverse environmental impact." <FN 51> The statutory language is comprised of blunt, absolute terms designed to ensure the minimization of adverse impact, i.e., acceptance of only those impacts which are unavoidable. The word "best" means "surpassing all others" or "to the highest degree," while "minimize" means "to decrease to the least possible amount, degree, etc."<FN 52> The absolute term "minimize" is distinct in meaning from the relative term "reduce" which means "to lessen in any way."<FN 53> Because Congress chose to use the word "best," and the word "minimize" rather than "reduce," the technology must achieve more than mere reduction of environmental impact; it must either eliminate environmental impact (if that is possible) or decrease it to the lowest level possible.

Accordingly, each one of those four enumerated factors must reflect BTA when needed to minimize impacts: the location must reflect BTA; the design must reflect BTA; the construction must reflect BTA; and the capacity <FN 54> must reflect BTA. A section 316(b) regulation which requires BTA for less than all of the four enumerated factors violates the statute if it contributes to a failure to minimize impacts. Such requirement is suggested under standard principles of statutory construction since Congress used the conjunctive "and" rather than the disjunctive "or" to join the list of factors. It is impossible to minimize adverse environmental impacts without minimizing capacity. Capacity is always a factor; it is always an important factor; and given the quantum difference in capacity between different cooling technologies, it is typically the most important factor.

Footnotes

51 33 U.S.C. § 1326(b) (emphasis added).

52 Webster 's New World Dictionary of the American Language. Second College Edition. pp. 135.905.

53 Id. at p. 1191.

54 "Capacity" of a cooling water intake structure includes the maximum volume of water that it can withdraw. 65 Fed. Reg. at 49085. Section 316(b) authorizes EPA to impose limitations on flow volume as a means of addressing capacity. In re Brunswick Steam Electric Plant, Decision of the General Counsel No.41 (June I, 1976).

EPA Response

On the basis of the supporting data presented in the proposed rule and the NODA, Track I and Track II of today's final rule does address flow/capacity limitations. EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See ,# 2-029, 2-013L-R15 and 2-013J). EPA also has determined that a capacity- and location-based limit on withdrawals is an achievable

requirement that will have little or no impact on the location of cooling water intake structures projected to be built over the next 20 years.
In the final rule intake capacity requirements for all new Track I facilities with cooling water intake structures mandate that facilities reduce the total design intake flow to a level, at a minimum, commensurate with that which can be attained by a closed-cycle recirculating cooling water system using minimized make-up and blowdown flows. See § 125.84 (b)(1). EPA believes that reducing the cooling water intake structure's capacity is one of the most effective means of reducing entrainment (and impingement). Capacity includes the volume of water that can be withdrawn through a cooling water intake structure over a period of time. Limiting the volume of the water withdrawn from a waterbody typically reduces the number of aquatic organisms in that waterbody that otherwise would be entrained.

In addition to flow/capacity requirements this rule imposes BTA requirements for other factors (such as location via proportional flow requirements, and design and construction through requirements to address both factors) as needed to minimize impacts.

Comment ID 316bNFR.206.010

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper, et al.

Subject Matter Code 12.0
Best Technology Available-Flow and Volume

Capacity (Total Flow) Is Always Critical To Minimizing Adverse Environmental Impact From Cooling Water Intakes.

Submitted with these comments is a report prepared by Drs. Peter A. Henderson and Richard M. Seaby of Pisces Conservation, Ltd., that reviews and evaluates the ecological basis for the Proposed Regulation.<FN 55> Drs. Henderson and Seaby reviewed literature and data on cooling water intakes from many power plants in freshwater, marine and estuarine water bodies in the U.S. and Great Britain, and concluded that there is a direct relationship between the volume of water pumped and the number of fish impinged and entrained.<FN 56> The following regression equations summarize the average correlation for all of the plants studied:

I = 0.023(G+340.25)^1.844

E = 1.816(G+340.25)^1.658

where "I" represents the number of fish impinged per year, "E" is the number of fish entrained per year, and "G" is gallons of water per second.<FN 57> The power function indicates a particularly sensitive relationship: increases in water withdrawal will result in a greater proportional increase in entrainment and impingement mortality.

As the Pisces Report explains:

It is impossible to remove any significant volume of water from a lake, reservoir, river or the ocean without also removing some of the organisms that are living within it. When water is extracted from healthy natural waters, to an over-riding degree the number of organisms killed be they fish, crustaceans or members of the plankton increases with the volume of water pumped. <FN 58>

Accordingly, in order to minimize adverse environmental impact, EPA must address the best technology to minimize intake capacity in all cases. EPA's failure to specify best technology available for capacity to minimize adverse environmental impact is an abuse of discretion, particularly where existing technologies are able to dramatically reduce total intake flow, and thus impacts, compared to the ancient systems the Proposed Regulation would continue to permit.<FN 59>

As explained below in Part III, Section A.1., even the waters considered by EPA to be the least sensitive and biologically productive contain significant quantities of aquatic life, and are adversely affected by the withdrawal of large extractions of water. In fact, as Drs. Henderson and Seaby explain in the Pisces Report, mathematical analysis of data from a large number of U.S. and European power plants show "no appreciable difference in overall catch rate over a wide range of habitats and geographical position."<FN 60> As such, "pumping rate is considerably more important than locality and intake configuration in determining the number of fish either entrained or impinged."<FN 61>

Footnotes

55 Technical Evaluation of us Environmental Protection Agency Proposed Cooling Water Intake Regulations for New Facilities, prepared by Drs. P. A. Henderson & R. M. Seaby, Pisces Conservation Ltd., November 2000 (the "Pisces Report"). Pisces is a British environmental consulting firm that has extensive experience consulting on the ecological impacts of power plants, including in particular the impacts of cooling water intakes and thermal discharges on the biota of surrounding waters. Key members of Pisces staff have worked for more than 30 years on power plant effects in many parts of the world. See Attachment A to the Pisces Report for a description of Pisces' experience in evaluating environmental impacts of power plants, including the curricula vitae of Drs. Henderson and Seaby.

56 Pisces Report, § 3.

57 Id.

58 Pisces Report, § 7 (emphasis added).

59 EPA's opinion that location is most important factor in addressing CWIS impacts, see 65 Fed. Reg. at 49077, is irrelevant, because capacity is always critical to the number offish kills. EPA's observation is also erroneous, given the huge disparity in water requirements between the intake technologies. The magnitude of environmental impact is more closely related to the choice between currently available cooling technologies than it is to location.

60 Pisces Report, § 5.

61 Id.

EPA Response

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. EPA disagrees with commenters that other factors influential to impingement and entrainment have been ignored. Both Track I and Track II of the final rule allow for site-specific evaluations in determining the appropriate technologies to be implemented. For example, the Design and Construction Technology Proposal Plan required in Track I and the Evaluation of Potential Cooling Water Intake Structure Effects in Track II allow for site specific consideration of factors other than flow to minimize impacts from impingement and entrainment. Cumulative impacts are addressed on a case-by-case basis by each permitting authority.

EPA expects that this final regulation will reduce impingement and entrainment at new facilities. The final rule establishes requirements that will help preserve aquatic organisms and the ecosystems they inhabit in waters used by cooling water intake structures at new facilities. EPA has considered the potential benefits of the rule; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also

accrue at population, community, or ecosystem levels of ecological structures. The preamble discusses these benefits to the extent possible in qualitative terms.

Comment ID 316bNFR.206.011

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

The "Best Technology Available" Requirement provides The Most Protective Technological Standard In The Clean Water Act.

The "best technology available" (BTA) standard is unique in the Clean Water Act. On its face, it is stricter than the Section 301 (b) requirement to impose the "best technology available economically achievable" (BAT) <FN 62> because it contains no explicit cost component. BTA is substantially similar to the Section 306 new source performance standard, "best available demonstrated control technology" (BADCT). <FN 63> Given the practically identical language and the application of the Proposed Regulation only to new sources, the BTA requirement is as least as stringent, and possibly more stringent, than the section 306 new source performance standard, and is therefore the most stringent categorical standard in the Clean Water Act. <FN 64>

BADCT standards for new sources are at least as stringent as BA T, and may be even more stringent.<FN 65> Congress required new sources to meet more stringent limitations than existing sources because new sources can incorporate the most efficient processes and systems in plant design. "The distinction drawn by Congress between new sources and existing sources reflected a belief that new...facilities could attain discharge levels at less costs and with fewer difficulties than existing sources."< FN 66> Both EPA and the regulated community have recognized that cooling water intake regulations for new sources may be more restrictive than for existing sources because new sources will typically incur fewer costs and have fewer technical problems with the installation of technically advanced measures to minimize impacts.<FN 67> The Clean Water Act's technology-based limitations were designed to force the iterative development of more protective technologies, and to ratchet down discharges and other impairments to water quality until they could be eliminated. Numerous courts have emphasized this "technology-forcing" character of the Act's categorical standards, within the context of the Section 301 BAT requirement:

The BAT standard reflects the intention of Congress to use the latest scientific research and technology in setting effluent limits, pushing industries toward the goal of zero discharge as quickly as possible. In setting BAT, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible." <FN 68> BAT must be "at a minimum, established with reference to the best performer in any industrial category." <FN 69> "The distinction between 'best practicable' and 'best available' is intended to reflect the need to press toward increasingly higher levels of control.<FN 70>

Section 316(b)'s BTA mandate, which is at least as strict as the BAT and new source standards, requires EPA to set extremely stringent cooling water intake standards that reflect state-of-the-art technology. As with BAT, BTA requires EPA to look to the optimally-operating plant, i.e., the best performer, and to bring all facilities up to the "best of the best" level, especially for new facilities.

Footnotes

62 CWA § 301(b)(2)(A); 33 U.S.C. § 1311(b)(2)(A).

63 The section 306 modifier "control" is directly analogous to the 316(b) objective to "'minimiz[e] adverse environmental impact." Both terms define the respective purpose of the technology: to control pollutant discharges under section 306 and to minimize ecological damage due to cooling water withdrawals under section 316(b). The other linguistic difference, the term "demonstrated," has no practical effect on the section 306 goal of basing new source performance standards on cutting-edge technology, because no technology can be "available" unless it has been demonstrated. "[I]t is clear that Congress did not intend by that phrase to limit the technology to that which is widely in use. ...' It will be sufficient, for the purpose of setting the level of control under available technology, that there be one operating facility which demonstrates that the level can be achieved or that there is sufficient information and data from a relevant pilot plant. ", American Iron & Steel Inst. v. EPA, 526 F .2d 1027, 1058 (3d Cir. 1975), quoting legislative history.

64 CWA § 306(a)(I); 33 U.S.C. § l3l6(a)(I). BAT and BADCT standards are more stringent than the BPT ("best conventional pollutant control technology") standard and the BCT ("best practicable control technology currently available") standard, which applied only in the earliest years of the Act.

65 See, American Iron & Steel Inst. v. EPA, 526 F .2d at 1058.

66 American Paper Institute v. Train, 543 F .2d 328, 354 (1976); see also Conf. Rep. on S. 2770 (October 4, 1972), Legislative History of the Federal Water Pollution Control Act of 1972 at 170,797,1476.

67 65 Fed. Reg. at 49064; July II, 2000 letter from Utility Water Action Group Cooling Systems Committee Chair David Bailey to 0MB Office of Information and Regulatory Affairs Deputy Administrator Don Arbuckle (UW AG letter), at 2, attached to July II, 2000 letter from Kristy A.N. Bulleit to EPA Office of Science and Technology Director Geoffrey Grubbs.

68 Kennecott v. EPA, 780 F.2d 445,448 (4th Cir. 1985), citing legislative history; see also National Ass .n of MET Al Finishers v. EPA, 719 F .2d 624, 657, n. 51 (3d Cir . 1983); FMC Corp. v. Train, 539 F.2d 973,983 (4th Cir. 1976); American Frozen Food Inst. v. EPA, 526 F .2d 107 , 117 (D.C. Cir. 1976); American Iron & Steel, 526 F .2d at 1061

69 Conf. Rep. On S. 2770 (October 4, 1972), Legislative History of the Federal Water Pollution Control Act of 1972 at 170.

70 Kennecott v. EPA, 780 F.2d 445,448 (4th Cir. 1985), citing legislative history.

EPA Response

EPA agrees that it is reasonable to interpret section 316(b) to authorize a primarily technology-based approach to the final rule for new facilities. The commenter's comments speak exclusively to one part of a technology-based rule. EPA notes that other considerations, such as economic practicality and non water quality environmental impacts (including energy impacts) are also relevant to technology-based determinations under the CWA. These other factors are relevant to the option EPA selected and other options that EPA rejected in this rule.

Comment ID 316bNFR.206.012

Author Name David K. Gordon & Reed W. Super
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Subject Matter Code 10.11
Request for Comment: Dry Cooling--Proposed Option

Dry Cooling Is The Best Technology Available Because It Reduces Intake Volume And The Killing Of Aquatic Organisms To Insignificant Levels And Yields Other Environmental Benefits.

Several categories of cooling systems are available to industry for power plants and other facilities. "Once-through" cooling systems take water from a local body of water, use it to absorb heat from the facility (in the case of electric power plants, from the steam condensers), and discharge it back at an elevated temperature. In a once-through system none of the cooling water is recirculated and extremely large volumes are required.

"Closed-cycle" cooling, in contrast, involves significant or complete recirculation of cooling water. In wet cooling systems (i.e., evaporative cooling towers), cooling water is circulated through cooling towers to transfer heat to the atmosphere by evaporation, and is then recirculated through the plant to absorb heat. Though closed-cycle cooling systems consume much less water than once-though cooling systems, they still require significant volumes of water to replace evaporative loss, known as "make-up," and cause significant thermal discharges to waterways, known as cooling tower “blowdown.”

"Dry-cooling" systems use radiator-type coils to transfer heat to air passing over the coils. In these systems, there is no water evaporation and virtually all water is recirculated. As a result, plants that use dry cooling have no visible plume and have much smaller water requirements. Plants with dry cooling systems have no thermal discharge to watersheds, only to air, and need to add additional water only occasionally for periodic system maintenance and cleaning.

Industry may also employ hybrid cooling systems that use both wet sections to cool by evaporation and dry sections to radiate heat. In wet/dry cooling systems, steam flows to both an evaporative cooling condenser and an dry-cooled condenser. In this system, water use is related to the percentage of the heat that is dispersed by the wet section. As a result, wet/dry systems have fewer water impacts than wet cooling systems, but more than dry cooling, the actual level of impacts depending upon the percentage of cooling which is wet.

The precise volume of water withdrawn by any of these systems depends on the size of the plant and the type of electricity generation technology. Generally, the higher the output of a power plant, the more cooling water is required. <FN 71> Combined-cycle plants require less cooling than steam-only plants of equivalent size.

The water requirements for the different cooling system categories vary by orders of magnitude. Once-through systems generally consume on the order of hundreds of millions or billions of gallons of water per day. The Salem Generating Station in New Jersey uses more than 3.3 billion gallons of water per day. Each reactor at the Indian Point facility in New York uses more than 1.4 billion gallons per day. Once-through systems at modern combined cycle plants will use somewhat less water, but the volumes for large plants are still in the hundreds of millions of gallons per day (mgd).

Closed-cycle systems reduce water usage by up to 97% over once through cooling. That is, a plant which would extract 200 mgd of water if cooled by a once- through system, will require only about 5% of that amount or 10 mgd if cooled by an evaporative cooling tower instead. The reduction in water use from saline sources is somewhat less, but still highly significant, at 75% or more.

Most importantly, dry cooling reduces intake volume by another 95% over cooling towers, to an ecologically insignificant volume. The recently-approved New York State NPDES (SPDES) permit for the Athens Generating Station on the Hudson River at Athens, New York allows withdrawals of no more than 0.18 mgd,. based on the capacity requirements for dry cooling at the largest plant of its type in the nation. A dry- cooled plant would kill on the order of one-thousandth the number of fish of comparably sized once-though plant.

Two additional factors allow dry cooling to further reduce or even eliminate fish kills. First, the relatively minuscule volumes required by dry cooling allow for lower intake velocities, smaller intake structures, and other factors that make fish avoidance measures much more effective. Second, dry cooling lowers intake volumes to levels which can be met by alternative water sources as such municipal water supplies, ground water, or treated sewage effluent discharges. By using such alternative water sources, power plants can be located away from waters of the U.S. Effectively, dry cooling capability decouples industrial cooling water needs from any sensitive or biologically productive water bodies.

Dry cooling systems provide non-aquatic ecological advantages as well. Because facilities using dry cooling need not be located near a major body of water, they need not disturb sensitive and valuable waterfront property. Such facilities can locate in brownfields or industrial parks, avoiding incompatibility of land uses. This significant increase in siting flexibility more than offsets the slightly greater land requirements for dry cooling towers.<FN 72> Additionally, dry cooling eliminates discharges to the atmosphere, thus avoiding the potential for visually offensive steam plumes, induction of fog, and airborne discharge of salt spray and biotic pollutants which require chemical controls.

Technology has advanced to the point where impacts on waters of the U.S. from cooling water intake structures can be virtually eliminated, so as to in part achieve a major aspiration of the Clean Water Act. <FN 73> Aquatic and other environmental impacts from dry cooled stations are negligible.<FN 74> By reducing cooling water intake volume and fish kills by 3 orders of magnitude, dry cooling clearly represents the best capacity technology available for minimizing adverse environmental impact, and the key component of the BTA determination. EPA has no discretion to disregard such an effective and proven technology in determining BTA.

Footnotes

71 Section 3 of the Pisces Report contains regression functions to describe the relationship between power output and cooling water requirements.

72 Comments on the EPA 's Proposed Regulations on Cooling Water Intake Structures for New Facilities, prepared by William Dougherty, Ph.D., Stephen Bemow Ph.D., and Tom Page, Tellus Institute, November 6, 2000 (the "Tellus Report"), p. 9.

73 33 U .S.C. § 1251 (a)(I) (goal to eliminate discharges into waters of the United States by 1985).

74 Pisces Report, § 6.

EPA Response

EPA rejects dry cooling as best technology available for the reasons discussed in Section V.C of the preamble to the final rule.

EPA generally agrees with the commenter's descriptions of once-through, closed-cycle wet, dry, and hybrid cooling systems. However, EPA notes that it is does not consider closed-cycle wet cooling systems to involve "complete recirculation of cooling water," as described by the commenter. EPA's analysis of make-up water rates at wet cooling towers demonstrates that complete recirculation is not achieved.

EPA disagrees with the generic statement made by the commenter to describe the water requirements of once-through cooling systems. EPA points out that the use of water is related to the cooling requirements of the plant, which are principally related to the capacity (in megawatts) and fuel-type (i.e., coal-fired, nuclear, combined-cycle, etc.) of the power plant. Therefore, for the case of extremely small capacity combined-cycle power plants, the amount of water used for once-through cooling may be orders of magnitude less than the generic figures presented. In addition, EPA notes that not all water entering and exiting a once-through cooling system is "consumed," although there is significant evaporation of water caused by the heating of water through once-through cooling (see response to comment 316bNFR.068.100). EPA also notes that the example of the Salem Station is for one of the worlds largest Nuclear power plants. As such, it is not representative of a typical situation, nor for any of the projected new facilities within the scope of this rule. In addition, elsewhere in the commenter's submission, the Salem cooling flow is quoted at 2.1 billion gallons of water per day, contrary to the figures presented in this specific comment.

EPA agrees with the description of water reduction at closed-cycle wet cooling systems. EPA notes that the average reduction of cooling water intake of a closed-cycle wet cooling system for an estuarine/tidal source is approximately 92 percent over a once-through system. See Chapter 2 of the Technical Development Document.

EPA agrees that dry cooling would potentially reduce intake flows by 95 percent over wet cooling towers. However, EPA points out that this figure is misleading to some degree because in comparison to the base system of once-through cooling, dry cooling only reduces cooling water intake by 4 to 7 percent more than recirculating closed-cycle wet cooling. EPA views this incremental assessment as the more important comparison when evaluating reductions in entrainment and impingement for the two technologies. The final rule effectively reduces impingement of organisms through the velocity and the design and construction technology requirements. Therefore, the primary issue of concern is entrainment. In the hypothetical example of the Athens Station (EPA points out that the permitted dry cooling plant in New York State is a planned facility, and not operating at the time of promulgation of this rule), the commenter hypothesizes that the dry cooling design would kill one-thousandth the number of fish compared to a once-through system. However, the commenter does not define the time period over which these fish kills will be reduced nor the total magnitude of these kills. Therefore, for the sake of hypothetical argument, EPA will estimate that, hypothetically, 3.65 million organisms per year would be entrained at the Athens plant if it were equipped with once-through cooling. The flow rate for the once-through system that EPA estimates would be 100 MGD. With a flow rate of 0.18 MGD (which corresponds to a hypothetical flow reduction of 99.8 percent over once-

through cooling), the dry cooling system would hypothetically entrain 6,570 organisms per year. The comparable organism entrainment due to a wet cooling tower system would hypothetical be 180,000 organisms per year (based on a flow reduction of 95 percent over a once-through system). Therefore, the difference between the wet tower and the dry tower in terms of total hypothetical organisms entrained per year would be approximately 176,000 hypothetical organisms. This corresponds to a 5 percent improvement in organism entrainment reduction for a dry cooling system over a wet cooling tower, as compared to the once-through base. EPA considers this hypothetical reduction in entrainment reduction to be insufficient to overcome the feasibility hurdles of dry cooling based requirements for the national rule, as described in Section V.C of the preamble to the final rule.

The two additional factors cited by the commenter that further reduce organism entrainment are equally applicable for wet cooling towers as to dry cooling towers. Just as described by the commenter, wet cooling tower systems will encourage and foster lower intake velocities. For the case of alternative water sources, wet cooling towers may not in all cases (depending on the size, location, and types of water sources available) be able to utilize these alternative sources exclusively. However, their use is anticipated at a subset of new planned power plants that will utilize wet cooling. The same flexibility in siting of plants away from waters of the US, which the commenter describes only for dry cooling, may also be achieved for small new power plants utilizing wet cooling towers and alternative water sources.

EPA disagrees that dry cooling systems always present property use advantages over comparable once-through and wet cooling systems. EPA points to the example of the Athens Generating Station provided by the commenter as a testament to the fact that even though plants may adopt dry cooling, that adoption will not deter them nor encourage them from locating adjacent to large bodies of water or in areas of high property value (whether that be economic, scenic, and/or habitat value). In fact, dry cooling plants require significantly more land area than comparably sized wet systems (as much as four times the land area). For these reasons, EPA disagrees with the argument. To some degree, by not requiring dry cooling and its associated increased land area needs, EPA has aided in the flexibility of power plants for siting options. EPA has not discouraged the adoption of dry cooling for specific projects, and as such, new power plants will have ample choices for siting of power plants.

The commenter is mistaken in the claim that dry cooling eliminates discharges to the atmosphere. While dry cooling may eliminate visual plumes, fog, and drift associated with wet cooling towers (see response to comment 316bNFR.068.100 for a discussion of how these effects are not of concern for environmental impact), the technology markedly affects the air emissions associated with electricity generation. EPA documents the expected increases in air emissions on a national scale for the dry cooling alternative in Chapter 3 of the Technical Development Document.

EPA disagrees that other environmental impacts from new dry cooled stations, if adopted for this final national rule, would be negligible. EPA points out that its analysis shows significant air emissions increases projected for new power plants if dry cooling were adopted. In addition, the reference cited by the commenter only refers to aquatic impacts, and not other environmental ones.

Comment ID 316bNFR.206.013

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Subject Matter Code 10.11
Request for Comment: Dry Cooling--Proposed Option

Dry Cooling Is A Proven, Effective Cooling Technology For All Power Plants Of All Types And Sizes In All Areas Of The County.

Besides being unquestionably the best technology available for minimizing adverse environmental impact from cooling water intake structures, dry cooling is also a proven, effective technology, the use of which is growing rapidly. Submitted with these comments is a report submitted by the Tellus Institute of Boston, Massachusetts.<FN 75> As the Tellus Report explains, there are over 600 electric power plants throughout the world that use dry cooling technology today. These dry cooling installations cool plants of all types, of all sizes and in all climates.

Power plants have been using dry cooling (a.k.a. air-cooled) systems for over 60 years. The first dry-cooled vacuum steam condenser was installed in Germany in 1938. The first use of this technology in the USA was in the late 1960's, after the technology had already become commonplace in many water-stressed areas throughout Europe. The technology works on the same principle as a standard automobile radiator. Waste heat from power plants is removed by directing steam through narrow tubes with flat cooling fins while air is blown across them, causing the steam to cool and condense back into water that is then recycled through the plant. <FN 76>

Dry cooling systems are effective, and have been installed, in a wide range of climatic zones (from "Tropical, Moist" to "Polar")<FN 77> throughout the world. Dry cooling systems work most efficiently in cooler climates because they use air-exchange rather than water-exchange to remove heat.<FN 78> However, power plants with dry cooling systems can be operated efficiently in even the warmest climates and there are nearly as many installed in warm areas as there are in cold. In hot, arid regions where access to water is difficult or impossible, dry-cooling systems are often the most economical option for power plants and large industrial facilities. Indeed, there are dry-cooling systems currently operating efficiently at power plants today in many regions with very hot climates, including Mexico, Ecuador, Nevada, southern California, and Hawaii. In fact, one of the largest air-cooled condenser has been installed at a 1,200 MW natural gas-fired combined cycle plant in Saudi Arabia where it can operate at ambient air temperatures up to 122 degrees F. <FN 79> Dry cooling technology now makes it possible to site even the largest power plants in all climate zones, and remote from navigable US waterways. <FN 80>

Dry cooling systems also have been installed at many different types of power plants. U.S. facilities using dry cooling range across all technology types (including many cogeneration and waste-to-energy plants), all combustible fuel sources (including coal, natural gas, solid waste, wood, methanol, landfill gas, and geothermal), and across all ownership categories (utility, non-utility, and industrial). GEA Power Cooling Systems, one of at least three dry cooling suppliers, has installed such systems at 55 power plants, including 23 combined cycle plants, 4 steam plants, 13 cogeneration plants, 14 waste-to-energy plants, and one methanol-fired plant. <FN 81>

Dry cooling systems are also installed on a wide variety of plant sizes. In the United States there are

at least 50 power plants with dry cooling systems in operation in least 20 states, ranging in size from 1 to 640 MW. In addition, two very large natural gas-fired combined-cycle plants with dry cooling systems are expected to be on line by 2002. They are Sithe Energies' new 1500 MW Mystic Generating Station near Boston and the Athens Generating Plant in Athens, NY at 1080 MW.

As is readily apparent from the Tellus Report, and can be easily confirmed by the manufacturers, dry cooling systems are effective and reliable for installation at every power plant in the country.

Footnotes

75 Comments on the EPA's Proposed Regulations on Cooling Water Intake Structures for New Facilities, prepared by William Dougherty, Ph.D., Stephen Bemow, Ph.D., and Tom Page, Tellus Institute, November 6, 2000 (the "Tellus Report").

76 Tellus Report, p. 1. There are two types of dry-cooling systems, direct-acting and indirect-acting. Both systems use large fans to increase the rate of heat transfer to the air. Direct systems, the most prevalent type of air cooled condenser currently used in the U.S. move the steam through tubes with external heat-transfer fins that are open to the atmosphere. Indirect systems use an intermediary water loop to transfer waste the heat from the steam to a dry cooling tower, which radiates the heat to the atmosphere. Submitted with these comments is literature on dry cooling systems from GEA Power Cooling Systems and BDT Engineering, two dry cooling system manufacturers.

77 Id. at p. 11, showing distribution of dry cooled-plants across Koppen Climate Classification.

78 Id. at p. 11. In cold climates, where ambient air temperatures are often significantly below 40 degrees F, dry cooling systems are more efficient at removing heat than comparable wet-cooling systems. There are dry-cooling systems currently operating at power plants today in the cold climates of Canada and northern US states such as Alaska, Wyoming, Minnesota, and Maine.

79 Id. at p. 11

80 Id. at p. 17

81 Id. at p. 11

EPA Response

EPA disagrees that dry cooling technology is appropriate for all new facility power plants of all types and sizes in all areas of the country. See the preamble to the final rule. See also, responses to comments 316bNFR.206.014 and 316bNFR.006.007. As stated by the commenter, "dry cooling systems work most efficiently in cooler climates." EPA disagrees that dry cooling systems can be operated efficiently in the warmest climates of the US for the numbers of new facilities subject to this rule. In fact, the comparative energy penalty of a dry cooling plant in a hot environment at peak summer conditions can exceed 12 percent, according to EPA's analysis of energy penalties presented in Chapter 3 of the Technical Development Document. The commenter acknowledges that the primary motivation for the construction of dry cooling plants in hot arid environments is the lack of available water supply. EPA agrees that water availability is a significant consideration for power plants in arid environments, and as such, encourages new plants that can afford the significantly elevated capital and operation and maintenance costs of the dry systems to adopt the technology when the site conditions are favorable, such as the examples presented by the commenter, and when the power plant size is moderate to small. However, EPA considers the significant cost and energy impacts of the system to be a serious concern for a national rule that will impact 83 new power plants.

EPA recognizes that dry cooling has been installed at a wide variety of power plants utilizing many fuel types. However, EPA notes that for the case of coal-fired plants, the largest operating plant in the United States with dry cooling is the Wyodak Station in Gillette, WY with a total cooling capacity of 330 MW (1.9 million lbs/hr of steam). This is significantly smaller than 10 of the projected coal-fired power plants within the scope of the rule and slightly smaller than 25 of the combined cycle plants. In addition, the design temperature of the dry system at this plant, which directly affects the size of the dry cooling system, is below average for conditions throughout the United States (the Wyodak Station has a design temperature of 66 deg F, whereas recent combined-cycle dry cooling systems in Rhode Island, Massachusetts, and New York have been designed above 90 deg F).

The data provided in the Tellus report referenced by this comment contradicts the claim made that dry cooling is demonstrated for a wide range of plant sizes. According to the data provided by the commenter, only two plants of capacity greater than 100 MW were constructed in the United States between 1990 and 1999 that incorporated dry cooling. Of these plants, both were combined-cycle type facilities, which require roughly one-third the cooling capacity of a comparable coal-fired plant. The two planned, but not yet constructed, facilities referenced by the commenter -- the Sithe Energies plant (1500 MW) and the Athens Generating Plant (1080 MW) -- are both combined cycle plants. The comparable capacity of these plants are approximately 500 MW steam for Sithe's Mystic Station and 360 MW steam for the Athens Plant. Comparably, the mean size coal-fired plant projected within the scope of this rule is approximately 900 MW steam. Therefore, the average size coal-fired plant within the scope of this rule would exceed the largest planned dry cooling plant in the United States (the Mystic Plant) by approximately 400 MW steam. The average size coal-fired plant projected within the scope of this rule would exceed the one of the largest demonstrated dry cooling system in the world (the Millmerran Power Project in Australia with a coal-fired capacity of 840 MW) by 60 MW. Four of the coal-fired power plants projected within the scope of this rule would exceed the capacity of the Millmerran Project by 725 MW or more (approximately twice the steam capacity of the United States' largest dry cooling demonstration).

Dry Cooling Installations Are Economically Affordable, Beneficial And Are Increasingly-Frequent.

As noted, the Clean Water Act affords compliance costs a minor role, if any, in the determination of best technology available for minimizing adverse environmental impact from new sources. More importantly, the incremental costs of installing and operating dry cooling systems are relatively insignificant in the context of the electric generating industry's overall capital costs, revenues and profits. In any event, the incremental costs pale in comparison to the vast benefit to aquatic and marine resources which dry cooling provides. Moreover, dry cooling may provide environmental benefits beyond the huge avoidance of impact to aquatic and marine ecosystems, and may provide other economic benefits to the power industry.

Tellus conducted a comparative economic assessment of the costs of a zero intake rule compared to the other options in order to determine whether dry cooling is cost-effective. EPA estimated that the total annualized cost of a national dry cooling requirement would be $193 million, and electric generators would incur $187.2 million of that total. Applying the Proposed Regulation's "compliance cost/revenue test," the Tellus Report demonstrates that the capital cost and operations and maintenance costs of air-cooled structures at combined-cycle electric generating plants represents a small fraction, only 2-3%, of the estimated annual revenues for those facilities. <FN 82>

Even despite somewhat higher incremental costs for dry cooling, other factors often compensate for or offset such costs, or even provide a net economic benefit for industry as well as the public. As a result, as explained below and more fully in the Tellus Report, dry cooling installations at electric power plants are increasingly common and growing rapidly. First, because newer combined-cycle plants need cooling only for the steam portion of their cycle (only about a third of their total capacity), they can be cooled with a much smaller dry cooling system than a comparably sized, steam-only generating plant. Thus the increased cost for dry cooling is considerably smaller than it would have otherwise been for conventional steam plants. In fact, dry cooling costs at today's combined cycle facilities are roughly equivalent to the costs for installing a wet system at a conventional steam facility. <FN 83>

Moreover, rising populations, urban sprawl, and economic growth in arid parts of the country have put ever greater strains on U.S. aquatic and marine resources. In many areas regulators and the public are growing increasingly intolerant of irresponsible water use, especially at the prodigious amounts consumed by power plants. Indeed, the emphasis in many states in recent years has been on "zero-discharge" facilities. As a result, dry cooling often streamlines the permitting process for all parties by avoiding controversial and complex assessment of ecosystem damage and mitigation strategies. Such sensitivity to water concerns years ago led European regulators to pioneer the use of dry cooling. <FN 84>

In some climates, dry cooling systems for some facilities may be 1% -2% less efficient in cooling power plant condensers, resulting in corresponding increases in costs (referred to as an "energy

penalty"). However, dry cooling facilitates an increase in energy transmission efficiency because the minimal water consumption needs of air- cooled facilities allow them to be located much closer to consumers than wet-cooled facilities which are required to locate on major water bodies. The increased siting flexibility afforded by dry cooling increases efficiency and decreases transmission losses, thus yielding a net efficiency gain throughout the entire generation-to-consumption system. <FN 85> In any event, energy conservation measures can more than offset any potential minor loss of efficiency from dry cooling.<FN 86> Moreover, in cold climates, where ambient air temperatures are often significantly below 40 degrees F, dry cooling systems can actually be more efficient at removing heat than a comparable wet-cooling system. In such cases, less fuel is needed to produce an equivalent amount of energy, thereby reducing both costs and air emissions and affording an "energy bonus." <FN 87>

Any net efficiency losses that might result from the use of dry cooling must be viewed in the context of overall system-wide efficiency. The potential 1.5 % dry cooling energy loss is very small compared with other typical system-wide efficiency losses. A typical steam electric generator is only 30 to 40% energy efficient; two-thirds of the heat from fuel combustion in a typical steam electric generator is simply wasted. <FN 88> The most advanced new combined cycle turbines are capable of efficiencies as high as 60%. New cogeneration plants are often as high as 80 to 90 % energy-efficient because the exhaust heat can be put to use which avoids other fuel combustion elsewhere. Thus, the building of modern generating facilities with dry cooling systems provides significant efficiency gains which dwarfs any potential loss due to the cooling system design. <FN 89>

Applicants are quick to accept dry cooling, despite earlier misgivings, when regulators require it to preserve aquatic ecosystems and other natural resources. For example, PG&E Generating Co., after opposing dry cooling due to cost concerns, readily accepted a dry cooling-equivalent capacity permit condition set by the New York State Department of Environmental Conservation for its proposed plant at Athens, on the Hudson River. Shortly after the DEC ruling the PG&E director of government relations summarized the company's position: "We're not challenging any of the conditions. We're going to accept it. Glad to have it." <FN 90>

The practicability of dry cooling is further reflected in its increasingly common use. Though dry cooling systems still represent just a small fraction of the total market for power plant cooling, installations of dry cooling technology in the U.S. have been growing rapidly since the early 1980s. Approximately 27 percent of new capacity since 1985 has used dry cooling.

At present there are over 600 electric power plants throughout the world using dry cooling technology, including at least 50 in the U.S. representing nearly 6000 MW of generating capacity. <FN 91> Further, an additional 4600 MW of air-cooled capacity are currently under construction and due online by 2002, not counting additional capacity cooled by hybrid wet/dry cooling systems. Canada and Mexico together have at least 7 air-cooled power plants, representing roughly 1000 MW of online capacity. The world's largest air-cooled power plant is the 4000 MW Matimba Generating Station in South Africa, which-as a nation has over 10,000 MW of electric generating capacity online today using dry cooling systems.

Dry cooling is a demonstrated, available, proven, effective, reliable and affordable cooling technology, the use of which is rapidly increasing in the U.S. and world-wide. Because dry cooling systems are

the best technology available for minimizing the adverse environmental impact of cooling water intake structures, they must be required for all new facilities under the Phase I regulation.

Footnotes

82 Tellus Report, at pp. 14-16. Despite assembling some evidence suggesting that the capital cost and operations and maintenance costs of air-cooled structures are lower than suggested by EPA, Tellus nevertheless used the EPA values in its calculations.

83 Id. at p. 16.

84 Id. at p. 17.

85 Id. at p. 7. Electric transmission line losses lines are generally between S and percent system-wide for most electric grids.

86 Id. at p. 8. Nearly as much fuel is wasted by end-users of electric power as by electric generators. Typical office buildings in the U.S. waste about two-thirds of the energy it consumes each year. Thus, any losses in energy efficiency any associated with dry cooling could easily be recouped through targeted demand side management (i.e., conservation) measures

87 Id. at p. 7.

88 Id. at p. 8, citing Kaarsberg (1999).

89 Id. at p. 8. Indeed, EPA has issued Clean Air Act regulations for the electric industry that caused similar efficiency penalties in order to reduce the air pollutants NOx and SO2.

90 Albany Times-Union, July 15, 2000

91 EPA's preamble erroneously states that there are only 60 dry-cooled facilities world-wide. 65 Fed. Reg. at 49081.

EPA Response

EPA disagrees with the factual statements and arguments made by the commenter. Each issue is responded to below.

EPA disagrees that the "CWA affords compliance costs a minor role, if any, in the determination of best technology available for minimizing adverse environmental impact from new sources." EPA does not believe that section 316(b) of the CWA precludes EPA from considering cost. This interpretation is supported by section 316(b)'s cross references to sections 301 and 306 of the CWA which may reasonably be interpreted to mean that Congress intended EPA to control intake when it controlled discharges under the same technology-based standard. It is inconsistent for the commenter to advocate EPA to interpret the references to 301 and 306 to support a technology-based approach to the rule but then to advocate that EPA may not consider the factors listed in sections 304(BAT) or 306 (NSPS) in determining "best technology available for minimizing adverse environmental impact" under CWA section 316(b). Moreover, this interpretation is supported by the similarity of the statutory standards in section 316(b)("best technology available for minimizing adverse environmental impact") to the statutory standards in sections 301, 304, and 306 of the CWA. C.I.R. v. Lundy, 516 U.S. 235 (1996)(It is a normal rule of statutory construction that identical words used in different part of the same act are intended to have the same meaning.) Section 306(b)(1)(B), governing new source performance standards for new sources, specifically states that in establishing "best available demonstrated control technology," the Administrator shall take into consideration "the cost of

achieving such effluent reduction." Sections 301 and 304 which require EPA to establish effluent limitations guidelines for existing facilities that reflect "best available technology" or "best available technology economically achievable," "best conventional technology" and "best practicable technology" all provide that cost may be considered to some degree. For example, in considering "best available technology," the statute provides EPA shall consider "the cost of achieving such effluent reduction." See CWA section 304(b)(2)(B). Several courts (as well as the EPA Administrator in a number of formal adjudications cited below) have stated that cost is an appropriate factor under section 316(b). In Seacoast Anti-Pollution League v. Costle, 597 F.2d 306, 311 (1st Cir. 1979), the Court stated "[t]he legislative history clearly makes cost an acceptable consideration in determining whether the intake design reflect[s] the best technology available." In United States Steel Corp. v. Train, 556 F.2d 822, 850 (7th Cir. 1977), the Court in finding section 308 conferred sufficient authority for requiring monitoring of cooling water intake structures independent of a cost benefit analysis, said, " . . . we trust that EPA will conduct a limited cost-benefit analysis once the information on which an evaluation of the various technologies can be made becomes available." Hudson Riverkeeper Fund, Inc. v. Orange Rockland Util., Inc., 835 F. Supp. 160, 165-66 (S.D.N.Y. 1993). For these reasons, EPA believes it reasonable to interpret the unique phrase "best technology available for minimizing adverse environmental impact" in a manner that allows EPA to consider cost.

Precisely how to consider cost in the context of the 316(b) rule for new facilities has been a matter of some dispute. EPA has long stated that neither the statute nor the legislative history requires a formal or informal cost-benefit assessment. 41 Fed. Reg. 17,387 (April 26, 1976). The 1976 preamble also stated that the term "best technology available" should be interpreted as best technology available at an economically practicable cost." See 118 CONG. REC 33,762 (1972), reprinted in 1 Legislative History of the Water Pollution Control Act Amendments of 1972, at 264 (1973)(Statement of Representative Don H. Clausen.).

Historically, the EPA Administrator has addressed this issue in the context of several formal adjudications in which he determined that no formal cost benefit balancing was required but that costs could be considered if wholly disproportionate to the environmental benefit. See In the Matter of Public Service Company of New Hampshire, et al., (Seabrook Station Units 1 and 2) NPDES Case No. 76-7 (NPDES Permit Application No. NH 0020338; 1977 NPDES LEXIS 6 (June 10, 1977), where the Administrator overturned the decision of the Regional Administrator who at the time, advocated that section 316(b) required cost/benefit balancing. The Administrator held that "there is nothing in section 316(b) indicating that a cost/benefit analysis should be done." At the same time, the Administrator stated that "I do not believe it is reasonable to interpret Section 316(b) as requiring use of technology whose cost is wholly disproportionate to the environmental benefit to be gained." See also Decision of the General Counsel, No. 63 In re Central Hudson Gas and Electric Corp., (July 29, 1977). This "wholly disproportionate" test has also been applied in the effluent guidelines program with respect to the first stage of technology controls, "best practicable technology." See Rybachek v. EPA, 904 F.2d 1276 (9th Cir. 1990); CMA v. EPA, 870 F.2d 177 (5th Cir. 1989); Association of Pacific Fisheries, 615 F.2d 794 (9th Cir 1980).

In this rule for new facilities, after notice and comment rulemaking, EPA has adopted an approach to considering costs that is analogous to how costs are considered in establishing new source performance standards for new sources "best available demonstrated control technology", and for effluent limitations guidelines for existing sources under the second (1983) level of control for certain

pollutants, “best available technology.” As stated in the preamble to the proposed rule, this position reflects congressional concern that the application of best technology available should not impose an impracticable and unbearable economic burden. 65 Fed. Reg. 49094 (August 10, 2000). EPA believes this approach is appropriate for new facilities. Thus at proposal, and in this final rule governing new facility cooling water intake structures, EPA has examined cost to revenue ratios and potential barriers to entry in a manner analogous to how it looks at economic achievability for certain effluent limitations guidelines and all new source performance standards. As a supplementary analysis, EPA has found it reasonable to consider the incremental effectiveness (in terms of reductions in impingement and entrainment) as compared to the incremental cost of various technologies. EPA believes that the unique phrase “minimizing adverse environmental impact” in CWA section 316(b) supports an interpretation that considers the practicability and reasonableness of incrementally stringent measures, including, among other things, economic considerations. This is consistent with several decisions interpreting the role of costs under BAT effluent limitations guidelines. For example, in American Petroleum Institute v. E.P.A., 787 F.2d 965, 972 (5th Cir. 1986), the court upheld certain controls on trace amounts of mercury and cadmium because the costs of the limitations would not be significant. At the same time, the Court stated, “”Indeed, EPA would disserve its mandate were it to tilt at windmills by imposing BAT limitations which removed de minimis amounts of polluting agents from out nation’s waters, while imposing possibly disabling costs upon the regulated industry.” This approach is analogous to EPA’s decision not to require controls based on dry cooling, as discussed in the preamble to the final rule.

EPA disagrees that the incremental costs of installing and operating dry cooling systems are relatively insignificant in the context of the electric generating industry's overall capital costs, revenues, and profits.

EPA's economic analysis of the dry cooling alternative for the final rule demonstrates that all 83 power plants will experience cost to revenue impacts greater than 4% for a zero or near-zero intake requirement. Twelve plants will experience cost to revenue impacts greater than 10%. As such, EPA challenges assertions that the incremental costs of dry cooling systems are insignificant in any context.

As discussed in the notice of data availability EPA has estimated compliance costs of a dry cooling including the replacement power costs of the energy penalty. See response to comment 316bNFR.068.332 and 66 FR 28066. In addition, the number of new power plants projected within the scope of the rule has increased since proposal. See the preamble to the final rule. As such, the costs quoted by the commenter regarding the proposal estimates of the dry cooling option have changed significantly. The final rule analysis, which includes the contribution of the energy penalty to the recurring annual costs, projects that the total annualized cost for the dry cooling alternative is $490 million (in 2000 dollars). EPA notes that the vast majority of costs associated with this option are incurred at the 83 power plants, and not at the 38 manufacturers. Because dry cooling is not a feasible option for all manufacturing facilities (see response to comment 316bNFR.028.022 and section V.C-4 of the preamble to the final rule), EPA only applied costs of recirculating wet cooling towers to these types of facilities. Therefore, of the $490 million dollars in annualized cost for the dry cooling option, the 83 power plants accept the most sizable burden. The cost to revenue impacts of this regulatory option, as noted above, would far exceed the values estimated by the commenter. For direct comparison, the average cost to revenue per power plant would be greater that 4.0% for all

power plants. EPA considers this level of cost to revenue impacts to be significant. In comparison, the cost to revenue impacts of the final rule, which is based in part on flow reduction commensurate with that achieved using recirculating closed-cycle wet cooling, do not exceed 3.0 percent for a single facility, and the vast majority of the impacts are below 1.0 percent.

The statement made by the commenter about the reduced need for steam condensation at combined-cycle power plants is supportive of the points EPA has made regarding the true size of the dry cooling installations at what the commenter deems large demonstrated cases. (See response to comment 316bNFR.206.013 for further discussion.)

EPA disagrees that dry cooling costs at today's combined-cycle facilities "are roughly equivalent to the costs for installing a wet system at a conventional coal-fired facility." This assertion is misleading and untrue. A comparison of capital costs between equally sized combined-cycle plants for wet and dry cooling tower systems reveals that the dry cooling plant's capital costs would exceed those of the wet cooling tower plant by 3.3 fold. The installed wet cooling tower capital cost is approximately $9.98 million, while the dry cooling installation would cost approximately $33.4 million. For a typical, modern 700-MW combined-cycle power plant, these erected capital costs represent approximately less than 2 percent for wet cooling and approximately 7 percent for dry cooling of the total capital cost of the power plant construction project. (See "example_dry_v_wet.cost.xls" in the docket.) Hence, the erected capital costs of dry cooling systems as compared to wet cooling towers for the same sized 700-MW combined-cycle power plant are significantly more expensive and by no means “insignificant.” EPA notes that this is simply the erected capital cost and does not include the operation and maintenance costs associated with these two types of cooling systems. The operation and maintenance costs of the wet cooling tower (without including the effects of energy penalties) would be $1.8 million per year, while the dry cooling system would cost $7.4 million per annum. Without incorporating energy penalties, the ratio of operation and maintenance costs of dry cooling to wet cooling for a typical 700-MW combined-cycle power plant would be approximately 4 to 1. After factoring in the recurring costs of energy penalties at the two plants, the recurring annual costs increase to approximately $2.3 million for the wet tower plant and $10 million for the dry cooling plant. This corresponds to a dry to wet ratio greater than 4 to 1. The total annualized costs of these systems are estimated at $3 million for the wet cooling tower system and $13 million for the dry cooling system (a ratio of greater than 4 to 1).

EPA estimates that the capital cost of a wet cooling tower installation at a 700-MW coal-fired plant (i.e., of the same capacity as the combined-cycle plant described in the preceding paragraph), the total erected capital cost of a cooling tower system would be approximately $15.5 million. This shows that the commenter is incorrect in claiming that comparative costs of coal-fired plants with wet towers to those of dry cooled combined-cycle plants of equal capacity (in megawatts) are "roughly equivalent." The ratio of erected capital costs for dry cooling at a typical 700-MW combined-cycle plant to wet towers at a typical 700-MW coal-fired plant is 2.2. Similar ratios are seen for operation and maintenance costs, energy penalty costs, and total annualized costs. EPA disagrees that this is even a reasonable comparison, but includes the results as evidence that the commenter's statements are without factual basis.

EPA notes that in the commenter's footnote 82, the reference states, "despite assembling some evidence suggesting that the capital cost and operations and maintenance costs of air-cooled

structures are lower than suggested by EPA, Tellus nevertheless used the EPA values in its calculations." EPA points out that the referenced report provides no evidence of this claim and provides no data to counter EPA's estimates.

With respect to the commenter's statement regarding the abundance of dry cooling applications, EPA questions the basis for the statement that "the emphasis in many states in recent years has been on 'zero discharge' facilities." The commenter does not expand on the types of "facilities" they mean. By inference EPA must assume that the commenter implies power plant facilities. If this is the case, then the commenter exaggerates trends in production of dry cooling versus wet cooling for recent power plant projects. As pointed out in comment 316bNFR.525.204, in the 1995 to 1999 five-year period, approximately 380 MW of new power plants were constructed with dry cooling (corresponding to a 2.5 percent growth in dry cooling usage). During this same period, over 10,000 MW of new growth with wet cooling came on-line (a 1.2 percent growth in wet cooling usage). To EPA, this data does not imply that the emphasis in many states in recent years has been on zero-discharge power plants.

With respect to European political motivations for development of policies concerning water usage, EPA believes that it is nevertheless appropriate for the U.S. to balance factors relevant here as articulated in the preamble to the final rule.

EPA agrees that in select climates, and for select types of facilities, dry cooling systems are 1 to 2 percent less efficient in cooling of plant condensers than wet cooling systems. EPA adds that this is true only for combined-cycle plants, where the mean annual energy penalty (averaged across climates) is 2.1 percent for dry cooling compared to once-through systems. However, for many other cases, the energy penalty is dramatically higher for dry cooling compared to either once-through or wet cooling towers. For instance, southern climates see a significant energy penalty, and coal-fired plants show mean annual penalties (averaged across climates) of 8.6 percent. In addition, the peak summer shortfalls during hot periods can be debilitating. These shortfalls range from 2.4 percent in the best case to 12.3 percent in the worst. See Chapter 3 of the Technical Development Document.

EPA disagrees that energy transmission efficiencies should factor into a consideration of the relative efficiency of any cooling system, let alone for future power plants whose siting will be influenced by many factors outside the scope of this rule. First, there is no information provided by the commenter, nor any reason given, to view a regulatory option based on dry cooling as to encourage location of plants closer to consumers. Considering that land costs are generally more expensive near and in urban areas, and that the dry cooling systems require significantly more land than comparably sized wet systems, the commenter’s assertions are without merit, nor do they address the issue of public opposition to power plant construction. Second, electricity is delivered to a grid, which then delivers power to consumers. This is especially true today with the advent of deregulated markets. As pointed out in footnote 85 to the comment, the transmission losses are assigned to the grid, as a whole, not individual plants. Therefore, the loss of electricity for plants supplying to a grid, which then delivers to consumers (often over long distances) would be the same for power plants located nearby or great distances from the end consumer. Even if the distance between generator and consumer is appreciably shortened, which EPA views as a misconception, the necessary voltage step-up at the plant, the voltage step-down at the distribution station, and a further voltage step-down for the consumer represent fixed losses that are independent of the distance the electricity moves.

In addition, EPA contends that the efficiency losses (i.e., energy penalties) of an alternative based on dry cooling are not "minor." In fact, the 1900 MW of lost energy capacity projected for the dry cooling alternative is anything but minor, in EPA's view. The equivalent of two very large or three large power plants would need to be constructed to overcome the energy losses of the dry cooling alternative. The air emissions increases as a result of this replacement capacity, if they were to come from increased generation across the US market, would be equivalent to those of three new 800MW coal-fired power plants. Alternatively, if the replacement capacity would be new capacity exclusively, it would be dry cooling equipped plants with the associated elevated capital and annual costs and land area requirements. Therefore, EPA considers the issue of inefficiency of dry cooling, and EPA's subsequent rejection of the dry cooling alternative, to be principal to the concept of energy conservation. Considering that the State of California recently experienced shortages of demand less than the energy penalty of the dry cooling option, the imposition of 1900 MW of mean annual energy penalty capacity loss on planned new power plants does not support the Administration's Energy Plan and associated Executive Orders.

EPA disagrees with the statement that, in cold climates, dry cooling systems can actually be more efficient at removing heat than a comparable wet-cooling system. This statement is patently false. As discussed in comments 316bNFR.524.201, 316bNFR.368.004, and 316bNFR.056.044, the practical limitations of the dry cooling system, as limited by the dry bulb temperature, which is always equal to or greater than the wet bulb temperature met by wet cooling systems, prevent its performance from exceeding that of wet cooling. Moreover, increased parasitic fan loads for dry cooling systems will ensure that the technology will not operate as efficiently as a comparable wet cooling system.

EPA disagrees that system-wide efficiency of a power plant is a relevant basis for dismissal of energy penalties. The projected power plants within the scope of this rule will primarily utilize combined-cycle designs and modern coal-fired designs, while small amounts of the new generating capacity within the scope of this rule may be in the form of cogeneration. The efficiency of the electricity production process is directly affected by the cooling system to be installed. The vast majority of projected new plants (i.e., 90 percent) would install closed-cycle recirculating cooling towers, regardless of the requirements of this rule. Therefore, EPA's technology-based performance requirements for final rule, which are based, in part, on recirculating closed-cycle cooling would impose potential changes in cooling system designs on only nine new plants. The comparable effect on the efficiency of these plants will be small on a facility level and national basis. See Chapter 3 of the Technical Development Document. However, a regulatory alternative based on dry cooling would impose cooling system design changes on each of the 83 power plants within the scope of the final rule. Therefore, each of the 14 projected coal-fired plants would experience a mean annual energy penalty of approximately 8.6 percent. As stated by the commenter, the typical steam electric generator (such as these coal-fired plants) would, at peak operation, operate at approximately 40 percent efficiency. The energy penalty of nearly 9 percent is very significant when compared to the system-wide energy efficiency of this type of power plant. Additionally, each of the 69 projected new combined-cycle plants would see a mean annual energy penalty of approximately 2.1 percent. With new design efficiencies of 60 percent, at peak operating efficiency, a 2.1 percent energy penalty is less striking than in the coal-fired cases. However, the cumulative effect for all 69 power plants is significant. EPA views energy loss as a more serious matter than the commenter, and disagrees that improvements in energy efficiency of modern plants would "dwarf" losses through the dry cooling systems.

Furthermore, EPA seeks to encourage replacement of older facilities with new combined-cycle facilities. By basing the requirements of the rule on dry cooling, EPA would create a disincentive to replacement of an older existing facility with a new facility due to a significant increase in annualized costs. Instead, generators would have an incentive to modify existing plants in a manner that would prevent them from being controlled by this rule.

The quotation from the director of PG&E is interesting, but hardly an endorsement of a technology. Although EPA supports dry cooling where a facility elects to use it (it would qualify for Track I), EPA is concerned for the reasons stated in the preamble and in this response about the downsides of requiring dry cooling on a national basis.

The statement made by the commenter that "approximately 27 percent of new capacity since 1985 has used dry cooling," is not substantiated and, in EPA's view, misleading. The commenter does not state where the new capacity has been constructed. As described in substantiated comments that EPA received to the notice of data availability, in the period from 1990 to 1999 only 36 dry cooled power plants worldwide were built with capacities greater than 50 MW. Of these, only 10 were constructed in the US; only one of these 10 had a capacity greater than 200 MW. Seventy-five percent of the dry cooling systems constructed in the last decade were not in the United States. See comment 316bNFR.524.204.

Comment ID 316bNFR.206.015

Subject Matter Code	18.2
	Compliance Cost/Revenue Test

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

EPA IMPROPERLY CONSIDERED COSTS ESTABLISHING BTA STANDARDS.

Section 316(b) does not explicitly provide that EPA may take compliance costs into consideration when establishing national standards requiring that cooling water intake structures reflect the best technology available. In contrast, other provisions of the Act that mandate the establishment of technology-based standards, such as Sections 301 and 306, require EPA to consider costs, and those provisions further specify how costs are to be considered.<FN 92> Significantly, the United States Court of Appeals for the D.C. Circuit has consistently held that, without specific statutory authorization for considering costs, "the EPA is not permitted to consider the cost of implementing those standards" under the Clean Air Act.<FN 93> This is especially true where the other provisions of the same statute direct EPA to consider costs, as certain sections of the Clean Water Act do. In such cases, courts conclude that Congress only intended EPA to consider costs where it has explicitly so provided. <FN 94>

In the preamble to this rule EPA claims that "best technology available"' should be interpreted as "best technology available commercially at an economically practicable cost." <FN 95> However, EPA's interpretation lacks support because it is not based not on any judicial authority or a reading of the plain language of the Act. Instead, it rests on a single statement in the legislative history and on EPA's own preamble to the 1976 rule.

Moreover, even if economic practicability were the standard, dry cooling is an economically practicable technology that constitutes BTA. EPA has traditionally used the "wholly disproportionate test" to compare the benefits of cooling water intake technology against the marginal cost to the ratepayer, i.e., the incremental electricity cost.<FN 96> If EPA were to apply that test now, dry cooling would be considered economically practicable because the environmental benefits, including among other things, avoiding the killing of trillions of fish, and the protection the ecological integrity of our nation's estuaries, rivers, lakes, and oceans, would clearly not be wholly disproportionate to the relatively minor costs of dry cooling. <FN 97>

Under the new cost test EPA proposes to employ, the "compliance cost/revenue test," dry cooling is also economically practicable as well. As discussed above, the costs associated with dry cooling represent a small fraction, less than 3%, of the annualized revenues of a typical combined-cycle power plant. <FN 98> It does not appear that EPA has, in the Proposed Regulation or preamble, established a threshold to identify when annual compliance costs constitute a disproportionate percentage of projected annual income, despite its stated intention to do so. <FN 99> Nevertheless, it is clear that dry cooling which represents such a small fraction of revenue to the electric generating industry (an extremely lucrative industry) is practicable. Indeed, many new facilities have chosen to install dry cooling, which is a fast growing technology, even in the absence of a requirement to so.<FN 100>

Footnotes

92 See. e.g., Section 304(b)(I)(B): "Factors relating to the assessment of best practicable control technology currently

available. ..shall include consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved," Section 304(b)(2)(B): "Factors relating to the assessment of best available technology shall take into account. ..the cost of achieving such effluent reduction," and Section 306: "In establishing ...Federal standards of performance for new sources... the Administrator shall take into consideration the cost of achieving such effluent reduction."

93 American Trucking Associations v. USEPA, 175 F.3d 1027, 1040 (D.C. Cir. 1999); see also Lead Industries Assoc. v. EPA, 647 F .2d 1130, 1148 (D.C. Cir. 1980).

94 Lead Industries Assoc., 647 F .2d at 1148

95 65 Fed. Reg. at 49094.

96 Under EPA's traditional wholly disproportionate cost test, a cooling water intake structure technology would not be deemed to reflect BTA if the incremental costs of requiring the use of that technology are wholly disproportionate to the environmental benefits to be gained through its use. Id.

97 EPA estimates the total, nationwide cost of dry cooling to all industrial users of cooling water, including both power industry and manufacturing, are only $192 million per year. That amount would result in a only a minor increase in ratepayer costs, if passed onto the electricity customer.

98 Tellus Report, p. 15

99 65 Fed. Reg. at 49094

100 See Part II, Sections 8.2 and 8.3, above and Tellus Report, at pp. 9-14, 16-19.

EPA Response

See response to comment 316bNFR.206.014. Regarding the Clean Air Act, see response to 316bNFR.514.009.

EPA rejects dry cooling as a national requirement for best technology because dry cooling is extremely costly and would pose a barrier to entry to the marketplace for many, if not most, of the projected new facilities. EPA evaluated a national dry cooling standard for all electric generators as one of the regulatory alternatives. The analysis showed extremely high annualized costs (in excess of [***$400 million] annually) and high economic impacts (annualized compliance costs between [***four and 20 percent] of estimated revenues) for all projected new electric generators.

EPA believes that the two-track option selected is extremely effective at reducing impingement and entrainment. While the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so at a cost significantly higher than that of wet cooling. Therefore, EPA does not consider it the “best technology available” for minimizing adverse environmental impact at a national level. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word “minimize” in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling

technology for some facilities. An application of dry cooling will, of course, meet the requirements of Track I. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas).

Comment ID 316bNFR.206.016

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Under the Proposed Regulation, lakes and reservoirs, fresh water rivers and streams, and oceans receive reduced levels protection on the most critical BTA factor - capacity. Rather than mandating an effective, uniform national technology-based capacity standard for cooling water intake structures, the Proposed Regulation provides lesser protection for vast sections of the nation's waterways based on perceived ecological value. Both the approach and the resulting disparity in standards contravene the letter and the spirit of the Clean Water Act.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA is setting the same performance-based technology requirements for all waterbodies as for tidal rivers and estuaries (the most stringent requirements from the proposed rule) under Track I of the final rule. Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. Under Track II there are design intake flow requirements that are based on waterbody categories (see Section 125.84)

Comment ID 316bNFR.206.017

Subject Matter Code	10.0
Best Technology Available	

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THE OVERWHELMING SUPERIORITY OF CLOSED CYCLE COOLING, AND DRY COOLING IN PARTICULAR, IN REDUCING CAPACITY NULLIFIES ANY CONSIDERATION OF ONCE-THROUGH COOLING AS BTA FOR THE NATION'S RIVERS, LAKES AND OCEANS.

The Proposed Regulation would fail to specify any capacity requirements for cooling water intakes for most of the waters of the United States. This omission would subject America's rivers, lakes and oceans, outside of their respective littoral zones (as defined in the Proposed Regulation) and a 50 meter buffer around the river and lake littoral zones, to the exorbitant withdrawals resulting from once through cooling.

There is no basis in the Clean Water Act or the ecology of America's disparate waterways for-such neglectful treatment. Once-through cooling can never be considered BTA on any water of the U.S. because of the enormous volume unnecessarily sucked in and the resulting impact on aquatic and marine life.

As noted above, industrial facilities using once through cooling pose a significant risk to aquatic and marine ecosystems because of the hundreds of millions of gallons they withdraw daily. The law requires NPDES permits for such withdrawals to reflect the best technology available for minimizing such impacts, and specifically includes intake capacity in the minimization mandate. Further, ecologically superior withdrawal techniques have existed for decades, and now are able to avoid adverse impacts almost entirely.

EPA Response

In the final rule, EPA is establishing capacity requirements in a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Under Track I, the capacity of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system. In addition, the design through-screen intake velocity is restricted to 0.5 ft/s. The rule also includes requirements that restrict the total quantity of intake in proportion to the mean annual flow of a freshwater river or stream, or the natural thermal stratification or turnover patterns of a lake or reservoir, or to a percentage of the tidal excursions of a tidal river or estuary. Further, the applicant must select and implement an appropriate design and construction technology for minimizing entrainment and impingement and maximizing impingement survival. Under Track II, the applicant has the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements for capacity and velocity. Proportional flow requirements also apply under Track II. Thus, the final rule includes requirements that either directly address capacity, or require the same level of performance as can be achieved through limiting capacity.

In evaluating dry cooling-based regulatory alternatives, EPA analyzed a zero or nearly zero intake flow requirement based on the use of dry cooling systems as the primary regulatory requirement in either (1) all waters of the U.S. or (2) tidal rivers, estuaries, the Great Lakes, and oceans. The Agency also considered subcategorization strategies for the new facility regulation based on size and types of new facilities and location within regions of the country, since these factors may affect the viability of dry cooling technologies.
EPA rejects dry cooling as best technology available for a national requirement and under the subcategorization strategies described above, because the technology of dry cooling carries costs that are sufficient to pose a barrier to entry to the marketplace for some projected new facilities. Dry cooling technology also has some detrimental effect on electricity production by reducing energy efficiency of steam turbines and is not technically feasible for all manufacturing applications. Finally, dry cooling technology may pose unfair competitive disadvantages by region and climate. Further, the two-track option selected is extremely effective at reducing impingement and entrainment, and while the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so at a cost that is more than three times the cost of wet cooling. Therefore, EPA does not find it to represent the "best technology available" for minimizing adverse environmental impact. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). An application of dry cooling will virtually eliminate use of cooling water and impingement and entrainment, in almost all foreseeable circumstances, would reduce a facility's use of cooling water below the levels that make a facility subject to these national minimum requirements.

Comment ID 316bNFR.206.018

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

ALL WATERS HAVE ECOLOGICAL VALUE SUBJECT TO DEGRADATION BY EXORBITANT COOLING WATER WITHDRAWALS.

EPA's failure to include cooling water capacity restrictions in the Proposed Regulation poses a stunning and irresponsible threat to America's rivers, lakes and oceans. Contrary to EPA's ranking of water bodies based on perceived ecological sensitivity, all of the nation's waters have high ecological value and support ecosystems that are vulnerable to damage.<FN 101> Many of our rivers, lakes and oceans are uniquely valuable due to the abundance of aquatic or marine life within them; the reliance of local communities on them; or the relative rarity or uniqueness of their component species or ecosystems. Such basic concepts are at the core of the Clean Water Act's purpose to improve, restore and protect all of the waters of the United States. Notably, the Act's salutary goals -and particularly its categorical treatment requirements - apply in spite of any existing degradation which may befall any individual waterway.

In contravention of basic Clean Water Act mandate and policy, the Proposed Regulation would permit once-through cooling on America's rivers, lakes and oceans. EPA appears willing to accept the eradication of aquatic life in massive areas of these water bodies by prodigious and unnecessary consumption of cooling water because it does not consider the majority of these waters outside principal spawning and nursery areas as "zones of biological concern."<FN 102> The agency has not produced any study which demonstrates that such eradication, even if kept outside spawning and nursery areas, minimizes ecological degradation.

Indeed, such consumption is highly likely to cause adverse impacts.<FN 103> In many cases, marine species use near shore sub-littoral ocean habitats as nursery grounds. These can be particularly important for juvenile flatfish that after metamorphosis initially settle in deeper water before moving into the shallows. In tropical and sub-tropical ocean waters juvenile fish rely on sub-littoral Zostera beds as a nursery habitat.<FN 104> According to the Center for Marine Conservation, the mesopelagic environment beyond the photic zone contains abundant marine life which would be vulnerable to water withdrawals.<FN 105> The recruitment success of a wide range of ichthyoplankton species in the California Current depends heavily on concentrated patches of phytoplankton located well offshore at the shelf margin as a food source.<FN 106> Moreover, many organisms, including both coral reef and kelp forest species, recruit adults by first sending larvae off shore for development.

The sub-littoral areas of freshwater lakes and rivers are similarly valuable, and vulnerable. EPA itself notes the potential damage to the Great Lakes from once through cooling, although the Proposed Rule allows once-through cooling there, outside the littoral zone and buffer.<FN 107> The agency's preamble comment that state permit writers may impose more restrictive measures on a site-specific basis is of little help, because it merely restates existing authority. The comment does not represent any justification for failing to properly apply the section 316(b) best technology available standard to these waters.

Footnotes

101 See. Pisces Report, § 2.

102 USEPA Section 3l6(b) Regulatory Development Project, "Definition for Zones of Biological Concern in Freshwater Rivers and Streams, Lakes, Reservoirs and Oceans, February 2000, DCN 1-5043-PR.

103 Pisces Report, § 2

104 Id.

105 See. November 7, 2000 letter from Center for Marine Conservation Counsel Kaitilin Gaffney to EPA.

106 Id.

107 65 Fed. Reg. at 49086

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. There are no distinctions between zones of biological concerns within a waterbody. Furthermore, today's rule does address flow/capacity limitations. Intake capacity requirements are established for all new Track I facilities with cooling water intake structures mandate that facilities reduce the total design intake flow to a level, at a minimum, commensurate with that which can be attained by a closed-cycle recirculating cooling water system using minimized make-up and blowdown flows. See § 125.84.

Also see response to comment 316bNFR.206.005.

Comment ID 316bNFR.206.019

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

EPA's attempt to limit the damage to aquatic ecosystems by banning once-through cooling in littoral zones is ineffective and unworkable. The Proposed Regulation's delineation of these more protected zones is based on broad assumption rather than careful examination of biological factors in the affected ecosystems and ignores a wide complexity of ecological interactions which mock any such discrete categorization.

The scheme is impossible to administer accurately. The Proposed "Regulation defines the littoral zone based on light penetration, which can vary greatly between seasons and even between days.<FN 108> As a result, regulators must use a determination of the littoral zone which is wrong for much of the year, removing any chance of accurate delineation. Such inaccuracy mocks any pretension of the littoral zone provisions to prevent wide scale damage to aquatic resources from once-through cooling.

More fundamentally, the scheme is based on gross ecological generalizations which do not reflect biological and physical interactions. EPA has relied on the ecological truism that littoral zones and estuaries are the most productive portions of water bodies to specify the moderately protective wet cooling-equivalent flow in these areas. The agency then defines such areas based only on light penetration, as a gross surrogate for ecological productivity. The Proposed Regulation thus ignores the complex physical and biological interactions which extend many of the most critical population aggregations outside the "Zone of Biological Concern."

For example, intakes just outside the oceanic littoral zone may be as destructive as those in the so-called "Zone of Biological Concern," especially in areas with extensive inter-tidal habitat. In turbid waters such as those near the mouths of estuaries, the photic zone may extend little beyond the extreme low water mark. At low water and particularly on spring tides, many organisms must retreat from the littoral, as defined in the Proposed Rule, to avoid dry or excessively shallow areas. They thus may follow the current directly into the vicinity of a once-through intake permitted by the Proposed Regulation. Additionally, large predatory fish often congregate in such areas as a hunting ground, exacerbating the impacts on the larval and juvenile populations. Moreover, the physical presence of a significant intake structure will alter the local ecological dynamic and attract both juvenile and predator species.<FN 109>

There is no ecological merit in allowing sub-littoral intakes in the lakes or oceans to be less stringently regulated than those situated in the littoral or in estuaries.<FN 110> In particular, once through cooling poses a significant risk of ecological damage which is unreasonable regulatory policy and antithetical to the Clean Water Act.

Footnotes

108 Pisces Report, § 2.

109 Pisces Report, § 2.

110 Pisces Report, § 2.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent comparable performance in a given waterbody in reducing fish and impacts shellfish by using alternative technologies or approaches for intake capacity or velocity.

While EPA continues to believe that it could have established different requirements based on general information about the productivity of water bodies, EPA decided for the new facility rule that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can reduce fish and shellfish impacts using different technologies.

Comment ID 316bNFR.206.020

Subject Matter Code	125.83.9
Definition: Estuary	

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The Proposed Regulation's distinction between estuaries and oceanic waters is similarly arbitrary and unprotective. It defines the ocean as areas of salinity at or above 30 parts per thousand (ppt),<FN 111> although full ocean water has a salinity of about 34 ppt. As a result, large areas of estuarine waters close to and within the mouths of the estuary will be outside the so-called "Zone of Biological Concern." Such areas are just as important for young fish as more internal estuarine waters, since many species migrate to marine waters as they develop or to take advantage of more moderate ocean temperatures during the winter.

Footnotes

111 Like the littoral definitions, the ocean definition cannot be consistently applied because it ignores the temporal variation in salinity. In estuaries and their adjacent coasts salinity varies both tidally and seasonally. Lower estuarine sites can vary in salinity from 20 to 32 ppt over a single tidal cycle and estuarine waters can vary from 5 to 32 ppt between seasons. Pisces Report, § 2.

EPA Response

EPA disagrees with the commenter that the definition is arbitrary. This definition was developed using guidance from other EPA programs and existing literature sources. The relevant definitions for the rule are as follows :

Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

Tidal river means the most seaward reach of a river or stream where the salinity is typically less than or equal to 0.5 parts per thousand (by mass) at a time of annual low flow and whose surface elevation responds to the effects of coastal lunar tides.

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This

prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.206.021

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

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Organization Riverkeeper, et al.

THE PROPOSED REGULATION'S FLOW LIMITS DO NOT COMPENSATE FOR THE LACK OF APPROPRIATE CAPACITY RESTRICTIONS.

EPA attempts to partially compensate for the lack of capacity limitations outside estuaries, littoral zones and associated buffers by applying additional intake flow limitations based on the total flow of the affected water bodies. These regulations do not replace appropriate capacity limitations in determining BTA for these water bodies.

EPA Response

EPA has eliminated waterbody type-specific requirements in today's final rule. EPA believes the framework established today is equally and sufficiently protective of all waterbodies, regardless of their hydrologic character.

Instead of varying requirements based on waterbody type EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

Comment ID 316bNFR.206.022

Subject Matter Code	12.1
Freshwater Streams/Rivers	

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The Proposed Regulation would limit the maximum intake flow from flowing rivers to the lesser of 5% of the average annual flow, or 25% of the stream 7Q10.<FN 112> The 25% of 7Q10 minimum constraint will often determine the upper limit for withdrawal, due to the high variability of most American rivers. The Proposed Regulation would therefore allow up to 25% of the flow to be withdrawn, and even more during an unusual drought, exacerbating significant stresses on the aquatic fauna. This could result in considerable ecological damage from which it might take the river fauna a number of years to recover. Indeed, recovery might not be complete before the next drought occurs so that the net result is a gradual degradation of the fauna. <FN 113> The river flow restriction thus offers no support for continuing to build once-through cooling systems, and is no substitute for a closed cycle cooling requirement.

Footnotes

112 EPA claims that the flow restriction taken in conjunction with other constraints will result in protection of at least 99% of the aquatic fauna. 65 F ed. Reg. at 49086. There is no available data to support the EPA claim. The number of animals killed would depend on the distribution and behavior of the organisms as well as the flow withdrawn and the variation in river flow. Pisces Report, § 3.

113 Pisces Report, § 3

EPA Response

EPA has opted not to include the 25% 7Q10 standard in today's final rule.

Comment ID 316bNFR.206.023

Subject Matter Code	12.21
Thermal Stratification	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

For facilities on lakes and reservoirs, the Proposed Regulation does not propose any analogous proportional flow restriction, "because the volume of the lakes and reservoirs on which they are located typically must be sufficient to accept their heated discharge and still maintain the efficiency of their cooling system."<FN 114> Instead, EPA proposes to restrict intake flow to that level which maintains the seasonal thermal stratification, on the assumption that this would limit the flow to a capacity "appropriate" for the size of the of the lake or reservoir, and thus limiting the number of aquatic organisms impinged or entrained.<FN 115> While maintenance of stratification is indeed a useful factor in protecting native ecosystems, EPA has provided no data explaining the relationship between a flow restriction which would achieve this and the avoidance of entrainment and impingement, or the protection afforded by BTA.

There is no such relationship with BTA. Nor is the restriction even properly tailored for maintenance of the stratified ecosystem. The restricted flux of oxygen and nutrients between the upper and lower layers, rather than the existence of the stratification itself, creates the aquatic conditions that lead to the characteristic communities of stratified lakes. But the restriction does not prevent the artificial circulation of such oxygen and nutrients. Intakes withdrawing water from close to the lake bed and discharging at the surface may significantly alter the nutrient flux, and thus the biotic community, while maintaining the thermal stratification.<FN 116> In some cases the ecological alterations have led to the growth of unnatural pathogens, giving rise to human health concerns.<FN 117>

The agency also has failed to explain how the restriction on the size of the cooling system mandated by the thermal dissipation capacity of the lake or reservoir relates to avoiding adverse impacts or the protection afforded by BTA. In fact, there is no such relationship here either. In general, heat is lost from the free surface of a water body, but the ecological impact of an intake relates more closely to the volume of the water body. For example, shallow and deep lakes of similar surface area might be able to dispose of similar amounts of waste heat, but the respective ecological impacts of a given volume of water withdrawal could be considerably different.<FN 118>

Footnotes

114 65 Fed. Reg. at 49086

115 65 Fed. Reg. at 49086.

116 Pisces Report, § 3

117 Id.

118 Pisces Report, § 3

EPA Response

EPA believes the natural thermal stratification of a lake, if present, influence the physical and

chemical cycles of lakes, which, in turn, strongly govern their production, utilization, and decomposition. A facility with a disproportionately large water intake can adversely impact both primary and secondary production. EPA believes the intake capacity standard for lakes and reservoirs is economically practicable and technologically achievable for new facilities, and will result in an acceptable level of source water protection.

While no percentage restriction is included for lakes and reservoirs in today's final rule, new facilities located on a lake or reservoir are required to establish a maximum intake capacity that will not disrupt the natural thermal stratification or turnover pattern of the source waterbody where such stratification or turnover pattern is determined to be beneficial. EPA believes an "across-the-board" limit is unworkable for lakes and reservoirs since the concept of flow is inapplicable to a lake. In addition, EPA believes preserving some degree of the natural thermal stratification, if present, is desirable because of the increased cooling efficiency that can result. The thermal stratification and turnover pattern standard, while different from the flow-based standards for estuaries and freshwater rivers, does limit a new facility to an intake capacity that will achieve an acceptable level of protection for the source water.

In today's final rule, EPA has addressed the commenter's concerns over the artificial disruption and circulation of dissolved oxygen and other nutrients by including language at Section 125.84 restricting the disruption of the natural turnover pattern of a lake or reservoir, if present.

EPA expects new facilities located on a lake or reservoir to work in conjunction with the permitting authority to correctly determine what constitutes an unacceptable disruption of any natural thermal stratification or turnover pattern.

Comment ID 316bNFR.206.024

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Subject Matter Code 10.0

Best Technology Available

Section 316(b) requires BTA for intake capacity, as well as the other listed parameters, whenever such restriction would help minimize adverse environmental impacts. The Proposed Regulation's failure to provide any capacity restriction remotely reflecting dry cooling or any form of closed cycle cooling on large sections of the nations waters, and thus permitting the exorbitant waste of once-through withdrawal, disqualifies it from serious consideration as BTA.

EPA Response

See response to 316bNFR.206.017.

The Proposed Regulation would also violate the Clean Water Act by establishing technology-based categorical standards (BTA) based in large part on source water ecology. Both EPA's proposed approach and the result are antithetical to the 1972 Clean Water Act which mandates that technology-based standards be nationally uniform. The Act provides no basis for EPA to set weaker industrial treatment standards based on real or perceived local ecological issues; indeed Congress explicitly rejected such an approach with respect to local water quality.

The Clean Water Act was enacted in 1972 in order to correct the inadequacies of prior federal water quality law, which after 24 years had failed to make any significant progress in protecting and cleaning up our nation's waters. Prior to 1972, Congress attempted to use receiving water quality as the primary basis for setting pollution standards.<FN 119> States administered the program and were required to classify bodies of water in terms of desired uses and then issue water quality limits to ensure that water pollution would not interfere with those designated uses. <FN 120> The now infamous failures of that prior law have been well documented.<FN 121>

For one thing, the prior law's lack of uniform national standards caused a "race to the bottom," whereby polluters located wherever standards were most lenient and "most states did not impose strict controls because they feared competitive disadvantages and resulting out migration of industries."<FN 122> Further, the philosophy and goal of prior law was not to achieve clean water, but rather to have water quality support designated uses where such restrictions were deemed practical. Because standards were set with reference to a set of designated uses, the prior law sanctioned and perpetuated pollution, unless designated uses were affected. <FN 123>

After 24 years of experience, Congress realized both that its prior water pollution programs had failed and that "reliance on receiving water capacity as a crucial test for permissible pollution levels had contributed greatly to that failure." <FN 124> In drafting and ultimately enacting the legislation that became the Clean Water Act of 1972, Congress considered the failures of prior law, specifically abrogated its prior approach, and chose to adopt technology-based controls as the centerpiece of the new CWA. <FN 125>

The 1972 Clean Water Act thus represented a new approach: facilities are required to conform to strict industry-specific, technology-based standards, that are set without reference to receiving water quality.<FN 126> This new approach reflected Congress's views that national uniformity was necessary, and that pollution should be limited to the maximum extent technologically possible, even in the absence of proof of harm to particular receiving water bodies.<FN 127> First, national uniformity was desirable in part to avoid the "divisive task of favoring some regions of the country over others."<FN 128> Secondly, the new approach changed the relative rights of the public and industrial polluters. There was no longer a right to pollute or impair water quality; such impairment could continue only until technology exists to prevent it.<FN 129> Thus, the Act's goals include a complete elimination of discharges, and full restoration of waters of the U.S. to their natural pristine state. <FN 130>

Moreover, the technology-based approach which Congress enacted as the centerpiece of the Clean Water Act tracks other environmental laws such Clean Air Act: "The history of American pollution controls...reflects a continuing shift from harm- based and cost-benefit strategies to reliance on technology-based standards." <FN 131>

Unfortunately, EPA's Proposed Regulation reflects a reversion to the pre-1972 framework of differing standards and geographical preferences based more on the ecology of local water than on technology. The Proposed Regulation results in geographical preferences whereby certain waters of the U.S. receive lesser protection than others. This will naturally cause power plants and other large users of cooling water to locate where the requirements are less stringent.<FN 132> There is no justification for encouraging new facilities to locate on any particular type of water body, even if EPA's rudimentary and unsophisticated assessment of the relative ecological value of the nation's waterways were correct. While the division is not along state lines, as was the case prior to 1972, the result nevertheless favors certain locations in the country over others.

Further, EPA's chief criterion in selecting requirements was not technology but the perceived biological productivity of the waters were intakes would be placed.<FN 133> This approach is akin to the pre-1972 regulatory framework whereby waters were classified in terms of desired uses and water quality limits were calculated - often poorly - to avert interfering with those designated uses. EPA's determination in the Proposed Regulation that rivers, lakes and estuaries are deserving of lesser protection runs counter to the framework of the 1972 Act which rejected approaches based on local ecological considerations, in favor of national standards based on technology. As the legislative history reveals, Congress believed that "'[t]he use of any river, lake, stream or ocean as a waste treatment system is unacceptable' regardless of the measurable impact of the waste on the body of water in question. ...' [W]e know so little about the ultimate consequences of injection of new matter into water that [the Act requires] a presumption of pollution…" <FN 134> This principle applies with equal force to the impairments to biological integrity caused by cooling water intake structures. The Act requires such impairment to be minimized by the application of best technology to all facilities, not by measuring the impact in particular water bodies.

As a result, the Proposed Regulation is "not in accordance with law" and "in excess of statutory jurisdiction, authority, or limitations" within the meaning of Administrative Procedure Act section 706.<FN 135>

Footnotes

119 Weyerhaeuser Ca. v. Castle, 590 F .2d 1011 , 1041 citing W. Rodgers, Environmental Law, pp. 355-357 (1977).

120 Latin. Overview and Critique: Regulatory Failure. Administrative Incentives. and The New Clean Air. 21 Envtl. L. 164 7. 1660 (Summer. 1991).

121 See, e.g., Hines, Controlling Industrial Water Pollution: Color the Problem Green. 9 B.C. Indus. and Comm. L. Rev. 553,573 (1968); Note, Effective National Regulation of Point Sources Under the 1972 Federal Water Pollution Control Act, 10 Ga.L.Rev. 983 (1976); D. Zwick, Water Wasteland(1971); Parenteau & Tauman, The Effluent Limitations Controversy, 6 Ecology L.Q. 1, 8-12 (1976).

122 Id.

123 For a discussion of the approach of pre-1972 water quality laws, see Grad, Treatise on Environmental Law, v.2, § 303[a-l].

124 Weyerhaeuser Co. v. Costle, 590 F.2d 1011,1041 (D.C. Cir. 1978) ; see also EPA v. State Water Resources Control Board, 426 U.S. 200,202 (1976).

125 Latin, Overview and Critique: Regulatory Failure. Administrative Incentives. and The New Clean Air, 21 Envt1. L. 1647, 1660-1661 (Summer, 1991) [footnotes omitted].

126 Weyerhaeuser Co. v. Costle, 590 F.2d at 1041; EPA v. State Water Resources Control Board, 426 U.S. at 204-205; Save the Bay. Inc. v. EPA, 556 F.2d 1282, 1284 (5th Cir. 1977); American Frozen Foods Inst. v. Train, 176 U.S.App.D.C. 105,117; 539 F.2d 107,115 (D.C. Cir., 1976).

127 Weyerhaeuser Ca. v. Castle, 590 F.2d 1011, 1042 (D.C. Cir. 1978); see also S. Rep. No 414 at 50 (92nd Cong 1st Sess (1971)).

128 Id.

129 Id.; see also S. Rep. No 414 at 42 (92nd Cong 1st Sess (1971)).

130 CWA § 101(a); 33 U.S.C. § 1251(a). For comments by the Act's principal author on the zero discharge goal, see 117 Cong. Rec. 17402 (Daily Ed., Nov. 2, 1971, remarks of Sen. Muskie). The Act was the work of Senator Muskie's subcommittee on Air and Water Pollution of the Senate Committee on Public Works.

131 Latin, Overview and Critique: Regulatory Failure. Administrative Incentives. and The New Clean Air, 21 Envtl. L. 1647,1660-1661 (Summer, 1991).

132 Deregulation and decentralization of the power grid allows plants more freedom to locate apart from the end users of electricity, while they remain under some siting constraints due to transmission logistics.

133 65 Fed. Reg. at 49078.

134 Weyerhaeuser Co. v. Costle, 590 F.2d 1011, 1042 (D.C. Cir. 1978) (internal citations omitted).

135 5 U.S.C. § 706.

EPA Response

See responses to 316bNFR.008.010, 068.007, 068.008, 206.014. The final rule establishes nationally uniform technology-based performance requirements but also provides a reasonable amount of flexibility for new facilities to account for the natural variation in site-specific factors that affect locating, designing, constructing and operating one or more cooling water intake structures. In this way, the rule encourages innovation and the optimization of different control technologies while ensuring a level of performance based on best technology available to minimize adverse environmental impact.

Comment ID 316bNFR.206.026

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

THE DETERMINATION OF ADVERSE ENVIRONMENTAL IMPACT IS NOT A NECESSARY OR APPROPRIATE THRESHOLD FOR REQUIRING BEST TECHNOLOGY AVAILABLE.

Several of the approaches suggested by industry would require the agency to define the phrase "adverse environmental impact" in section 3l6(b). The basic purpose of such a definition would be to require a determination of adverse environmental impact as a threshold before a permitting agency would even consider mandating BTA:

UWAG believes that...EPA has an affirmative obligation to ensure that, before any specific intake technology requirements are imposed (whether on a site-specific basis or otherwise), those requirements have been shown to be enecessary to minimize 'adverse' environmental impacts....[T]he first step in any § 316(b) determination must be to assess whether the proposed CWIS will cause, or is reasonably likely to cause, [adverse environmental impact].<FN 136>

Industry is trying to create an additional procedural hurdle to the regulation of cooling water intake structures, by requiring that a proposed CWIS attain a threshold of adverse impact before best technology can be required. That approach, however, is wholly unnecessary and inconsistent with the language of Section 316(b) and the structure of the Clean Water Act. The only threshold requirements for application of Section 316(b) standards are that facilities include a point source (which is a NPDES permit prerequisite), must be in an industry subject to Section 301 and 306 standards (which includes all significant users of cooling water), and must have a cooling water intake structure.

UWAG complains that, without such a definition and determination, regulators may ignore the common applicant contention the entrainment and impingement-induced mortality of some early life stage organisms "have no measurable impact on the size of the general population."<FN 137> However, such "compensation" theory presents no reliable or acceptable rationale for avoiding BTA analysis on cooling water intake structures which kill millions of aquatic organisms. This counter-intuitive theory is woefully inaccurate, albeit convenient, on the scale typically claimed by industrial applicants.

Three factors typically render unsupportable industry's dismissal of such killing. First, there is insufficient scientific evidence to demonstrate the traditional claim, repeated by UWAG, that the killing of extremely large numbers of fish at various life stages does not adversely affect the population. Second, any so called "density dependence" in a given population is at least in part a result of the concomitant killing of the forage for the young of that species. And third, the killing of large numbers of fish by power plants causes many other negative impacts on the aquatic ecosystem as a whole, apart from the effects on specific fish populations, even if the entrained and impinged fish would not have survived to adulthood.

Compensation theory is based on the concept that there is "surplus production" of fish in water bodies.

However, from an ecosystem perspective there is never surplus production that can be removed from any component without impacting other parts of the system. Without the cooling water intake, other aquatic organisms would have consumed the organisms taken by the cooling water intake structure thereby benefiting higher levels of the food chain.<FN 138> Once fish are killed by power plants, they no longer provide food for the top of the food chain, but rather add to the amount of detritus in the ecosystem which feeds "decomposers" such as bacteria and fungi. Thus, the killing of large number of fish by cooling water intakes transfers energy from the upper levels of the food web to the lower levels, and selects bacteria over top predators.<FN 139>

As Drs. Henderson and Seaby explain, the net result of reduced energy flux to the top predators is an ecosystem dominated by simpler organisms. In fact, this promotion of decomposer forage at the expense of higher consumers is characteristic of the ecological degradation to the nations waters which in large part prompted the 1972 Clean Water Act amendments, and should therefore be a focus of NPDES permitting of CWISs.<FN 140>

Unfortunately, despite their clear limitations and the lack of definitive data, powerful compensation theories have become a convenient and common purported justification for cooling water intake fish kills. For example, the applicants for NPDES renewal at four power plants on the tidal Hudson River used density dependent population models to purport to assert the absence of adverse ecological impact from a combined once through cooling withdrawal of 4.2 billion gallons per day, despite the Hudson's status as one of the most biologically vibrant estuaries in the country. <FN 141>

At the very least, such assertions provide for months or years of delay, consuming the resources of agencies and intervenors alike. In light of the Proposed Regulation's 2 mgd de minimis threshold, and in light of their inaccuracies, compensation theories should not create a an unnecessary threshold to BTA regulation.

The New York State Department of Environmental Conservation ("DEC") has adopted the correct policy regarding adverse environmental impact as a regulatory threshold. DEC “considers the death of any fish at or through a cooling water intake to be an ‘adverse impact.’”<FN 142>

Like DEC, EPA should refuse to automatically allocate public fish and wildlife resources to electric energy generators or other cooling water intakes. Congress drafted section 316(b) to minimize adverse impacts, and not merely to ensure the protection of a balanced, indigenous population as provided in section 316(a). EPA apparently agrees with this interpretation:

The Agency considers the objective stated in section 316(b) to minimize adverse environmental impact from cooling water intake structures to be distinct from that of section 316(a) to ensure protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife. The Agency has long maintained that adverse environmental impact from cooling water intake structures must be minimized to the fullest extent practicable even in cases where it can be demonstrated that the standard applicable under section 316(a) is being met Thus the objective of section 316(b) is more protective than that of section 316(a). <FN 143>

While it is not realistic to expect to save every fish, the killing of any aquatic life by cooling water intake structures is the adverse impact that EPA must minimize by requiring best available technology

under section 316(b). The proposed definition and threshold determination would complicate and delay this task.

Industry's insistence that such a definition and determination is required is ill-considered and inaccurate. Contrary to the assertion of Public Service Electric and Gas (PSE&G), the Court of Appeals in Seacoast Anti-Pollution League v. Costle, the Court of Appeals upheld EPA's BTA determination, without ever considering whether such killing of many individual fish would result in "adverse environmental impact."<FN 144> Moreover, PSE&G relies on superseded EPA guidance to base much of the rest of its comments on the definition of adverse environmental impact.<FN 145>

Footnotes

136 See, e.g., UWAG letter at 3 (emphasis in original)

137 Id.

138 Pisces Report, § 6 citing "Surplus production, compensation, and impact assessments of power plants." Environmental Science & Policy 3: 445-449.

139 Pisces Report, § 6. For example, one study on the ecological effect of a power plant concerning creeks subject to discharges from the Crystal River Nuclear Power Station in Florida, showed that the stressed system impacted the food-chain and caused a marked change in material recycling. Id., citing Ulanowicz, R. E. (1996). Trophic flow networks as indicators of ecosystem stress. Food webs: Integration of patterns and dynamics. G. A. Polis and K. 0. Winemiller. New York, Chapman & Hall: 358-368.

140 Pisces Report, § 6.

141 See Draft Environmental Impact Statement for State Discharge Elimination System Permits for Bowline Point, Indian Point 2&3, and Roseton Steam Electric Generating Stations, December 1999.

142 New York State Department Of Environmental Conservation, Division Of Fish, Wildlife, and Marine Resources, "Clean Water Act Section 316(b), Statement provided to U.S. Environmental Protection Agency at June 29,1998 public meeting to discuss adverse environmental impacts resulting from cooling water intake structures."

143 65 Fed. Reg. at 49075 citing In re Brunswick Steam Electric Plant, Decision of the General Counsel No.41 , June I, 1976; In re Public Service Co. of New Hampshire, (Seabrook Station Units I and 2) (Decision of the Administrator) 10 ERC 1257, 1262 (June 17, 1977); and In re Central Hudson Gas and Elec. Corp., Decision of the General Counsel No.63, July 29, 1977.

144 PSE&G Comments NJPDES Draft Permit, Permit NO. NJO005622, September 16,1993, Appendix 0, DCN 1-1025-TC, (PSE&G Comments) at 3; 596 F.2d 306,309- 311 (15t Cir. 1979).

145 See PSE&G Comments at 3, relying on USEPA, Draft Guidelines to Determine Best Available Technology of the Location, Design, Construction, and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact, December, 1975; compare, USEPA, Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment, May 1977.

EPA Response

EPA disagrees with the statutory interpretation that AEI must be defined prior to installing intake technology. See the preamble to the final rule. Under today's rule, facilities may choose to implement Track I performance-based standards or conduct site-specific biological monitoring under Track II to

show comparable minimization of entrainment and impingement.

Please see responses to comments 316bNFR.507.004 and 316bNFR.529.006.

Comment ID 316bNFR.206.027

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

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EPA is also requesting comment on several alternative approaches to defining BTA that operate on an even more case-by-case and site-specific basis than the proposed Phase I regulations. Any case-by-case approach would favor industry stakeholders and present an unreasonable burden on environmentalists and local officials. As EPA correctly recognizes in its preamble:

The historical case-by-case approach requires significant resources on the part of the regulatory authorities that must implement section 316(b) requirement. [It] requires that each regulated facility must develop, submit, and refine studies that characterize or estimate potential adverse environmental impact. Such studies can take several years to complete and require the support of a multi-disciplinary team. In addition, given the iterative nature of the assessment process, industry as well as EPA regional and State regulatory authorities must expend significant resources assessing study plans and methods for characterizing the environmental impact occurring at each facility and evaluating those data to determine what constitutes BTA for each specific facility. <FN 146>

EPA actually understates the burden. Public commenters and intervenors have few resources to evaluate even the initial multi-disciplinary impact studies and volumes of technical supporting documents regarding CWIS characteristics and ecosystem impacts, let alone the months or years of hearings typically needed to adjudicate scientific disputes. Local officials and environmental advocates whose resources are dwarfed by those of industry should not be forced to counter industry's elaborate and self-serving technical obfuscation on generally applicable protection principles.

Any approach that does not set specific national, uniform performance standards for the critical-determination of capacity minimization would also violate the Clean Water Act. By leaving the BTA determination to the NPDES permit writer (state agencies in delegated states and EPA regional offices in non-delegated states), EPA would have abdicated its non-discretionary duty under Section 316(b) to set national BTA standards for generally applicable impact minimization parameters. Local agencies could require different technologies based on a variety of considerations outside the Clean Water Act, or could be forced to do so by the resources of industry applicants. The result of this approach would inevitably be that different facilities and states would have different BTA requirements for CWISs, thus ensuring inconsistent protection and potentially even reviving the "race to the bottom." To avoid creating a disincentive to power generators in a deregulated energy environment, or to avert fears of increased energy costs, states might be even more reluctant to establish stringent measures than they were in the pre-1972 context.

Footnotes

146 65 Fed. Reg. at 49079.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today’s rule.

EPA disagrees with the commenter's characterization of its obligations under § 316(b) but since EPA

is establishing national uniform requirements in this rule as the commenter suggests, EPA does not believe it is necessary to discuss these disagreements here.

Comment ID 316bNFR.206.028

Subject Matter Code	10.07
Decision Criteria for Determining Best Technology Available in a Case-by-Case	

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An Approach Resembling The 1976 "Decision Criteria" Disserves The Public Interest And Violates The Clean Water Act

EPA is inviting comment on

a rule framework that would resemble the framework the Agency proposed in the 1970s. EPA would implement section 316(b) on a case-by-case, site specific basis, but the Agency would establish specific decision criteria that the Director would have to consider when determining the appropriate BTA for minimizing adverse environmental impact. First the Director would determine whether an adverse environmental impact is or is not occurring. If an impact is occurring, the Director would consider a number of factors in determining what would constitute BTA and whether the facility is minimizing adverse environmental impact from cooling water intakes. <FN 147>

This proposed approach is counterproductive and in contravention of the Clean Water Act because of the reasons stated above and in the immediately preceding section discussion adverse environmental impact determinations.

Footnotes

147 65 Fed. Reg. at 49080. EPA suggests the, following regulatory language could be used to implement this approach:

The director must determine whether a cooling water intake structure is minimizing adverse environmental impact based on the consideration of:

(1) The composition and vulnerability of the biological communities within the cooling water intake structure's zone of influence;

(2) The importance of the source water body to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, and areas necessary for critical stages in the life cycle of aquatic organisms;

(3) Potential impingement of aquatic organisms based on the design intake velocity;

(4) Potential entrainment of small aquatic organisms based on the intake water flow;

(5) Existing or potential recreational, commercial, and subsistence fishing, including finfishing and shellfishing;

(6) Other factors relating to the adverse environmental impact of the intake, as may be appropriate

Id.

EPA Response

EPA did not adopt decision criteria to applied on a case-by case basis for the reasons discussed in VIII.A.1 of the proposed rule and II.C of the preamble to the final rule, including that this approach takes a longer period of time than makes sense for new facilities, particularly when the record

demonstrates that a large number of new facilities planned to meet the requirements independently of the rule. Rather, the final rule adopts a two-track approach that balances the need to provide clarity, consistency, and fast permitting, through specifying technology-based performance requirements in Track I, with the need to allow for some site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II.

Comment ID 316bNFR.206.029

Subject Matter Code	10.1
Request for Comment: Rebuttable Presumption Approach	

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The Rebuttable Presumption Approach Disserves The Public Interest And Violates The Clean Water Act.

EPA is also inviting comment on a "rebuttable presumption approach." Under that approach EPA would

establish a rebuttable presumption that the requirements of the proposed rule (or some other set of uniform national requirements based on this proposal) reflect BTA, but then allow a new facility, at its option and with the full burden of proof resting on the facility, to provide a demonstration that due to site-specific conditions at the site some alternative technology or suite of technologies would minimize adverse environmental impact.<FN 148>

The "rebuttable presumption" approach's variance would be procedurally similar to variance procedure of § 125.85 in the proposed Phase I rule, except that it would be based on "site-specific conditions" rather than "wholly disproportionate costs."

This approach would invite applicants to seek variances to avoid the cooling water technological mandates. As a practical matter, such an invitation would quickly devolve into a site by site consideration of ecological impact similar to the present, untenable situation.

Furthermore, it would violate the Clean Water Act because, as discussed below, the United States Supreme Court has found that no variances are permitted for new sources. Again, the language used by the Supreme Court in the context of the Section 306 New Source Performance Standards applies equally to 316(b) standards for new facilities (which are themselves New Source Performance Standards under Sections 306 and 316(b)): "there is no statutory provision for variances, and a variance provision would be inappropriate in a standard that was intended to insure national uniformity and 'maximum feasible control of new sources. "'<FN 149> Moreover, in the limited circumstances where variances are statutorily authorized by the Act -Sections 301(c) for economic variances and Section 301(n) for "fundamentally different factors" (both of which only apply to existing sources) - receiving water quality may not be considered as a factor.<FN 150>

Footnotes

148 65 Fed. Reg. at 49080. EPA's proposed regulatory language for the "rebuttable presumption" approach is as follows:

It shall be presumed that the requirements of Sec. 125.84(a) through (e) reflect the best technology available for minimizing adverse environmental impact for all facilities to which this regulation applies. However, any new facility subject to these regulations may request that alternative technology-based requirements be imposed in the permit based on site-specific conditions. Alternative requirements shall be approved only if:

(1) There is an applicable requirement under Sec. 125.84(a) through (e);

(2) Data and information specific to the facility and the affected environment demonstrate clearly and convincingly that the

facility will minimize adverse environmental impact by complying with the alternative requirements; and

(3) The alternative requirements will ensure compliance with sections 208(e) and 301(b)(I)(C) of the Clean Water Act.

The burden is on the facility requesting the alternative requirements to demonstrate clearly and convincingly that they will minimize adverse environmental impact and that the other requirements of (1) through (3) above are met.

149 E.I. DuPont v. Train, 430 U.S. 112, 138 (1977)

150 See 40 CFR § 125.3 1 (e)(4).

EPA Response

Given that it requires equivalent performance to the standards presumed to be BTA, the alternative does not function as a variance. See response to comment 316bNFR.009.004.

Comment ID 316bNFR.206.030

Subject Matter Code	10.14
Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")	

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The Three-Tiered Approach Suggested By Industry Violates The Clean Water Act.

EPA is also inviting comment on an elaborate three-tiered site-specific approach, suggested by the power industry. <FN 151> Under such approach, Tier I would be an assessment of the potential for risk of adverse environmental impact, defined as impacts to population levels of "designated important species." If the Director agreed that there is a low risk of adverse environmental impact to the population levels of these "designated important species," the proposed cooling water intake structure would determined to be BTA. Otherwise, the facility would proceed to Tier 2.

Tier 2 would focus on collection and analysis of additional information collection activities, as necessary, to make the adverse environmental impact determination. In Tier 2, the facility would conduct field studies for one of two purposes, following two separate tracks. In Track A, a facility might conduct special studies to provide adequate information to make a Tier 1 determination of its reasonable potential to cause adverse environmental impact. In Track B, the facility might conduct information collection activities (such as population modeling), as necessary, to make a Tier 2 determination as to whether the cooling water intake structure is reasonably likely to cause adverse environmental impact.

In Tier 3, assuming that the Director has found that the cooling water intake structure is reasonably likely to pose risk of adverse environmental impact, the facility would assess BTA alternatives, including an evaluation of costs and benefits. At its option, a facility could perform a benefit/cost analysis of the BTA candidate technologies. Otherwise, it could decide to offer a cooling water intake structure technology or technologies as BTA based on an initial performance assessment of their characteristics. If a facility proceeds with the cost/benefit analysis, BTA would be determined through application of a “reasonably proportional” standard. Also, the facility could propose restoration measures to address the adverse environmental impact that could be used in place of, or as a supplement to, BTA.

This three-tiered approach violates spirit and letter of the Clean Water Act in myriad respects which have been discussed above. It requires a threshold determination of adverse environmental impact; it would codify the problematic site-by-site approach to regulation and complicate it immeasurably by adding several layers of procedural formality; and it improperly considers costs and includes a full cost/benefit analysis.

Even worse, the proposal would return to the pre-1972 approach by defining environmental impact with reference to certain designated uses (i.e., protection of designated important species). Additionally, it does not require the minimization of environmental impact, the basic mandate of section 316(b).

Footnotes

151 See 65 Fed. Reg. at 49083

EPA Response

EPA did not adopt the three-tiered, site-specific approach suggested by industry. The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. Hence, the rule puts in place uniform national performance requirements using either a fast-track or demonstration track approach. See response to 316bNFR.008.001.

Comment ID 316bNFR.206.031

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name David K. Gordon & Reed W. Super

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EPA has invited comment on the appropriate role of restoration measures (i.e., practices that seek to conserve fish or aquatic organisms, compensate for the fish or aquatic organisms killed, or enhance the aquatic habitat harmed or destroyed by the operation of cooling water intake structures), if any, under section 3l6(b). <FN 152> While such measures may beneficial in compensating for past harms to the aquatic environment, they cannot be used as a substitute for dry cooling because they do not constitute best available technology for minimizing adverse environmental impact from cooling water intake structures, which is what Section 3l6(b) requires.

Footnotes

152 65 Fed. Reg. at 49089

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.206.032

Subject Matter Code	16.4
Request for Comment: Provision for Variance for Any National Best	

Author Name David K. Gordon & Reed W. Super

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NO VARIANCE PROCEDURE IS ALLOWED BECAUSE THE PHASE I RULE IS AKIN TO A NEW SOURCE PERFORMANCE STANDARD.

BTA standards for new facilities under section 316(b) are akin to new source performance standards (NSPS) promulgated under Section 306. This is made clear by the mandate in Section 316(b) that standards established pursuant to Section 306 must require BTA for CWISs. Indeed, as the VEPCO court stated:

It bears emphasis that § 316(b) ...requires § 301 and § 306 standards to deal with cooling water intake structures. ...§ 316(b) itself seems to indicate its limitations are to be adopted under §§ 301 and 306...[T]he regulations issued under § 316(b) are...closely related to the effluent limitations and new source standards of performance of §§ 301 and 306. <FN 153>

There is, however, no variance procedure statutorily permissible for NSPS. The only variances from technology-based standards allowed under the Act are in Sections 301(n) (the "fundamentally different factors" variance) and 301(c) (economic variance) both of which apply only to existing sources. The United States Supreme Court in E.I. DuPont v. Train found unequivocally that the Clean Water Act does not allow a variance procedure for new sources:

It is clear that Congress intended these regulations to be absolute prohibitions. The use of the word "standards" implies as much. So does the description of the preferred standard as one "permitting no discharge of pollutants." It is "unlawful for any owner or operator of any new source to operate such source in violation of any standard applicable to such source." § 306(e). In striking contrast to § 301(c), there is no statutory provision for variances, and a variance provision would be inappropriate in a standard that was intended to insure national uniformity and "maximum feasible control" of new sources. <FN 154>

As a result, the Clean Water Act does not permit EPA. in establishing national cooling water Intake regulations for new sources under Sections 316(b) and 306, to include a variance provision. Therefore, EPA's inclusion of a variance provision based on economic factors in the Proposed Regulation <FN 155> is not in accordance with law.

Footnotes

153 Virginia Electric and Power Company v. Costle. 566 F .2d 446, 450 (4th Cir. 1977).

154 E.I. DuPont v. Train. 430 U.S. 112, 138 (1977).

155 40 C.F.R. § 125.85 (proposed) (entitled "May alternative requirements be imposed?)

EPA Response

See preamble section VII.H. In this rule, EPA believes that it is guided by section 306 of the CWA

and section 304 with respect to taking a technology-based approach to the rule, and the factors relevant to such an approach, but because the variance authorizations in the CWA are under section 301 governing effluent limitations and because section 316(b) is in a different portion of the CWA than sections 301, 304 or 306, section 301's limitation of variances to existing sources do not control EPA in implementing section 316(b) for new facilities. In other words, the statute is silent with respect to variances for standards established under section 316(b). As such, where the statute is silent, a Chevron analysis applies. EPA believes that it is a reasonable interpretation of the act to allow for such a variance in establishing a rule implementing section 316(b) to provide for flexibility where EPA did not account for the types of costs a particular facility would face in the record for this rule. This could be the case where, for example, EPA did not consider a type of industry that has a cooling water intake and the costs of the rule are wholly disproportionate to the costs considered in this rulemaking. This is similar to the approach EPA undertook in implementing section 301(c) in Weyerhaeuser v. Costle, 590 F.2d 1011, 1033-35 (D.C. Cir. 1978). E.I. du Pont de Nemours & Co. v. Train, 430 U.S. 112 (1977) holding that section 306 does not authorize variances for new sources, is distinguishable, not only because that case was limited to new source performance standards for point source dischargers under section 306, but because Court's reasoning was based on the word "standards" in 306 as not providing any authority for difference. By contrast, in section 316(b), the word "standards" clearly refers to both new source performance standards and effluent limitations guidelines for existing sources, for which the CWA authorized variances. Thus, the use of the word "standards" could not be as limited in section 316(b) as it is in section 306; and therefore it is reasonable to interpret it to include flexibility not afforded to NSPS. Further, the Court looked toward ultimate objective of sections 301 and 306 as one "permitting no discharge of pollutants" which is different from the substantive standard articulated in 316(b) which is to "minimize" adverse environmental impact. Finally, section 316(b) is different than section 306 because it applies broadly to any cooling water intake structure, while each new source performance standard applies to a particular category that is fully considered during the rulemaking. It is more likely that this variance will be applied in the context of an industry that EPA did not consider at the time of this rulemaking.

Comment ID 316bNFR.206.036

Subject Matter Code DELETE

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Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Comment ID 316bNFR.206.100

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Comment ID 316bNFR.206.101

Subject Matter Code	11.0
Best Technology Available-Location	

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Organization Riverkeeper, et al.

Location

The proposed regulations classify waters in four types, (1) rivers and streams, (2) lakes and reservoirs, (3) estuarine and tidal rivers and (4) ocean. The most important result of this classification is that different types of water body will be subject to different regulations and thus differing levels of protection. All four classes of water body are of high ecological merit and hold communities that are vulnerable to damage and degradation by inappropriate water extraction and discharge. In the case of river, lake and ocean sites with sub-littoral intake points, the regulation would permit once through cooling, which is by far the most damaging to aquatic life. While a case can be made for once-through cooling in artificial impoundments and reservoirs built to serve as cooling ponds, this type of water body has not been distinguished from natural lakes. We question the EPA's basis for discriminating between these types of water body either in terms of their ecological value or ability to withstand stress.

The highest level of protection, including a closed cycle-equivalent flow, is offered for estuarine sites and the littoral zone for ocean, lacustrine and riverine waters. A small (50 m) buffer for the lacustrine and riverine littoral zone is included in the closed cycle-equivalent flow requirement. The lowest level of protection, allowing for once-through cooling, is permitted for all other ocean, lacustrine and riverine waters.

A consideration of the applicability of this distinction serves to emphasise the arbitrary nature of the proposed classification in terms of ecosystem protection. The regulatory scheme appears to be based on generalised characterisations of the different types of areas (e.g. estuaries and littoral zones are often considered the most productive per unit volume). However, the ultimate classifications and respective level of protection afforded bears little relation to the ecological dynamic present in those waters.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance

requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.206.102

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name David K. Gordon & Reed W. Super

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Proposed delineation of ocean and estuarine areas

The proposed regulation defines ocean sites as localities with salinity at or above 30 parts per thousand (ppt). Full ocean water has a salinity of about 34 ppt so this definition will include coastal sites close to and within the mouths of estuaries. The definition as given does not refer to the temporal variation in salinity. In estuaries and their adjacent coasts salinity varies both tidally and seasonally. Lower estuarine sites can vary in salinity from 20 to 32 ppt over a single tidal cycle and estuarine waters can vary from 5 to 32 ppt between seasons. If the 30 ppt criterion is not increased then it would result in large areas of estuarine waters becoming classified as ocean waters. Even if average salinity were used it would result in lower estuarine habitat and the mouths of rivers receiving the lowest level of protection. Such areas are just as important for young fish as more internal estuarine waters, and many species show a gradual movement to marine waters as they develop. Therefore, as will be discussed in more detail below, there is no clear distinction between estuarine and marine nursery areas. The use of the 30 ‰ salinity level to distinguish ocean from estuarine water is arbitrary and does not separate distinct and unconnected ecosystems.

EPA Response

The final rule does not contain these provisions. It adopts a different regulatory framework–a two-track approach–and is setting the same performance-based technology requirements for tidal rivers and estuaries as for all other waterbodies under Track I of the final rule. Therefore, it is no longer necessary to use a salinity criterion to distinguish between estuarine and marine waters. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.206.103

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Proposed level of protection in estuarine and non-estuarine waters

Estuarine habitats are used by a large number of fish and crustacean species for part of their life cycle. They are particularly important nursery areas and because of this function there has been considerable concern about the loss of juvenile fish on cooling water intakes in estuaries such as that of the Hudson River (Bamthouse, Klauda et al. 1988). However, many of these estuarine inhabitants will spend part of their life, usually as adults and juveniles, in marine waters. The striped bass is a good example of a fish that may use estuaries in this manner. Migratory species move between estuarine and marine waters seasonally and tend to follow particular routes. The proposed regulations would offer such species more protection during the estuarine than during the marine phase of their life. While this can be appropriate if, for example, the estuarine phase is particularly localised into a restricted zone of low salinity where it would be highly vulnerable to entrainment, this need not be the case. For fish such as migratory clupeids, it is possible to envisage situations where intakes situated outside of the littoral zone, in waters at or above 30 ppt, would be situated in channels used by returning migrants resulting in large-scale moralities. Another way in which fish and crustaceans can become particularly vulnerable to intakes placed in ocean water is during the winter when many species retreat from cold estuarine and littoral waters into warmer, deeper, ocean waters.

Such considerations lead to the conclusion that there can be no general biological basis to afford ocean waters (as defined in the proposed regulations) lower levels of protection than those offered to estuaries. This disparate treatment is especially problematic given the respective levels of protection afforded the two areas. As described more fully below and in the preamble to the proposed rule, there are up to two orders of magnitude difference in the level of entrainment between once-through cooling and wet cooling systems, and up to four orders of magnitude difference between once-through and dry cooling. EPA has suggested nothing, and we know of know data, to indicate that any supposed distinction between estuarine and ocean waters in terms of entrainment mortality remotely approaches this level of magnitude.

The same problem with the proposed regulation besets lacustrine and riverine waters outside the littoral buffer, since the capacity requirements applicable to the sub-littoral ocean would also apply to these fresh waters. Again, EPA has suggested nothing, and we know of know data, to indicate that any supposed distinction between estuarine and deep fresh waters justifies the installation of once-through cooling for the latter.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone.

EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones.

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches. Alternative technologies may include once-through cooling. Under the final rule EPA will allow once-through cooling if the facility can meet the requirements commensurate with closed-cycle recirculating system and all requirements of Section 125.84.

Comment ID 316bNFR.206.104

Subject Matter Code	11.2
Request for Comment: Considerations for Impacts Outside Littoral Zone	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper, et al.

The effects of intakes within and outside the littoral zone

A key aspect of the proposed regulations is the position of the intake with respect to the littoral zone. For freshwaters, the littoral zone is defined as the zone from the highest seasonal water mark to a depth at which (1) light is at 1% of ambient, (2) there is no significant change in slope and (3) there is no significant change in substrate. For ocean waters, it is defined simply as the euphotic zone.

In the case of lake and ocean waters, an intake placed outside the littoral zone (> 50 m for lakes) requires an intake velocity no more than 0.5 ft s^-1 and other requirements under 125.84(f) and (g) which relate to multiple intakes in the area, the presence of regionally important species and the attainment of water quality standards. Thus direct-cooling is permissible and the only protection to reduce fish and crustacean entrainment and impingement is the restriction on maximum intake velocity across the filter screens.

The first point to note is that the littoral zone is defined in terms of light penetration, but this can vary greatly between seasons and even between days. Turbid waters, or those with high plankton densities, can have a highly restricted photic zone, but can still support a rich ecosystem in their sub-littoral. In turbid waters, such as those near the mouths of estuaries, the photic zone may extend little beyond the extreme low water mark. In such situations the proposed regulation could allow a once-through intake to be positioned close to the beach. As EPA points out, the littoral zone is often of high ecological productivity and is used as a feeding area by many fish and crustaceans, particularly juveniles. However, at low water and particularly on spring tides, organisms must retreat from the littoral and thus may move directly into the vicinity of the intake. Furthermore, their natural tendency is to move with the current so that they leave any areas that may become dry or too shallow. Thus, they may follow the current directly into the intake. Large predatory fish are often loath to enter the littoral and tend to hunt in the near sub-littoral where they often feed towards low water when smaller organisms retreat from the littoral. Their area of highest density will therefore tend to be in the vicinity of sub-littoral intakes. In some circumstances they may actually use the region of flowing water around the intake as a hunting ground, aggregate around any intake structure and depending on intake design and screen size they may follow their prey into the intake pipes from which they cannot escape. Thus it is impossible to protect the fauna of the littoral by positioning intakes in the near sub-littoral. Further, the presence of the intake structure will alter the local ecology.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has

promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

For estuarine and ocean waters there is no support for the view that entrainment and impingement at once-through cooling water systems can be appreciably reduced by siting the intakes in the sub-littoral as many examples can be cited of high catch rates at such intakes (e.g. Henderson 1989). On the contrary, there are numerous examples of the use of near shore sub-littoral ocean habitats as nursery grounds. These can be particularly important for juvenile flatfish that after metamorphosis initially settle in deeper water before moving into the shallows. A clear example of a fully marine habitat that is used as a nursery by young fish are Zostera beds, which are particularly important in tropical and sub-tropical waters.

Two studies illustrate the level of impingement at ocean sites, and the difficulty of achieving reduction. Units 2 & 3 of the San Onofre Nuclear Generating Station (SONGS) in southern California have a once-through cooling system with water extracted from an offshore intake at a flow rate of 13,833 gallons s-1. To minimise fish impingement mortality a fish return system is used in which the fish are diverted, elevated and sluiced away from the filter screens. Love (1989) undertook a study of the efficiency of this fish return system. For 1984, the total number of fish estimated to be entering the cooling water system was 196,978 of which 188,583 were returned and 8,395 impinged. For 1985, the total number of fish estimated to be entering the cooling water system was 407,755 of which 306,200 were returned and 101,555 impinged. However, not all of the returned fish would have survived as the 96 hr survival rate of Anchoa compressa, Anchoa delicatissima, Genyonemus lineatus and Seriphus politus were around or below 50% and these species are amongst the commonest species caught. Moreover, the ability to survive in a recovery pen may still overstate the efficiency of the return system as waiting predators may eat the returned fish. Love (1989) state that "Small groups of barred bass and kelp bass and solitary California halibut congregate near the discharge, having apparently associated the conduit opening with food. However, it is infrequent visits of schooling predators such as jack mackerel, Pacific mackerel and large Scomber politus that appear to result in the largest predation pressure. We observed schools on 13 of 80 days of observations on the return system's discharge." This tendency for intakes and outfalls to attract predators is also considered above in the Section on ecosystem effects.

The second example is the study at Sizewell A & B Nuclear Power Stations on the English coast which demonstrates the level of reduced fish impingement mortality that can be achieved at a direct-cooled ocean site (Fleming, Seaby et al. 1994). The B station intakes were carefully positioned offshore; they were fitted with a velocity cap; the intake structure was minimised to avoid attracting fish; and the station was fitted with a fish return system. As in the case of the SONGS return system, it was not possible to save many of the pelagic fish, particularly clupeids. Seaby (1994) found that while flounder, plaice, sole dab and bass had survival rates greater than 80% after release from the fish return system, survival of whiting, sprat, herring and pout was much lower. In the case of the pelagic sprat and herring survival was negligible. An important observation was that fish that have a sealed swim bladder (physoclists) were highly vulnerable to abrupt pressure changes and frequently suffered fatal swim bladder damage. This was not the case for species with swim bladders that open to the gut (physotomes). When water is extracted from the sub-littoral animals entering the system will

inevitably suffer abrupt pressure changes, which for some species will be fatal. The result was a 50% reduction in impingement deaths compared with the A station that had none of these features. However, the station still killed many millions of fish per annum. Furthermore, no improvement in entrainment mortality was produced.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Furthermore, any large structure on the sea or lake bed will attract some types of fish and crustacean. The reasons are complex but include shelter from currents, predator avoidance or food resources brought to the area or growing on the structure. Thus intakes can influence the local ecology and the fish they catch may not be the same as those that would live in the area if the intake were not present (See Section 4 below for an example of a design where the superstructure was minimised). An example of a species using an offshore intake structure is given by Benda et al. (1975). They found that the crayfish, Orconcetes propinquis, inhabited the intake crib of the Palisades Power Plant on Lake Michigan (the crib is a 17.4 m long, 17.4 m wide, 3.7 m high structure located 1000 m offshore 6.1 m below the lake surface). The crayfish were actually impinged in greater numbers when the intake volume was reduced. Helvey (1981) in study of an offshore intake near Redondo Beach, California clearly demonstrated the structure influenced the fish community.

A tidal pattern of capture on sub-littoral intakes with most of the catch occurring around low water is particularly pronounced at localities where there are extensive areas of inter-tidal habitat. A particularly clear example is given by Henderson (1987) in a study of impingement at Hinkley Point Nuclear Power Station which is situated in the lower Severn Estuary, England. This is a high turbidity estuary, the salinity at the intakes is frequently above 30‰, and the sub-littoral intake is placed offshore of a 40 km^2 area of inter-tidal mud flat. Some of the most abundant animals, including the common shrimp, Crangon crangon, are typically impinged around low water when they have retreated from the inter-tidal towards the sub-tidal intake. Fish such as gobies that also use the littoral show a similar tidal pattern.

Pelagic fish, such as the members of the herring family, tend to avoid coastal littoral zones but frequently aggregate close inshore. Thus they are particularly vulnerable to sub-littoral intakes. In regions where intakes have been positioned on migratory routes or over-wintering grounds very large catches have been recorded. Other migratory fish are also known to move along coasts and into estuaries by following near shore depth contours along the sub-littoral and thus will be particularly vulnerable to sub- littoral intakes. The above considerations explain why offshore, sub-littoral intakes usually catch as many fish as intakes positioned on-shore (See Section 3 below for an example of a study of catch rates at different marine and estuarine localities). The assertion in the proposal which states "the littoral zone is generally the area where aquatic organisms are the most abundant and most susceptible to impingement and entrainment" is not supported by observation.

There is no ecological merit in allowing sub-littoral intakes in the lakes or oceans to be less stringently regulated than those situated in the littoral or in estuaries, and there is significant danger in allowing once-through cooling in sub-littoral areas. We know of no study that indicates that the 50 m buffer EPA proposes outside of the freshwater littoral zones is sufficient to alleviate the potential hazards, and all indications are that significant ecological impairment may occur. There may be areas of coast, well away from estuaries and situated in unproductive waters, where sub-littoral intakes would catch few fish. A possible example from Table 1 is Wylfa Nuclear Power Station; however, this is situated on a rocky, exposed, shore and tends to catch reef living fish that are often territorial and live in

smaller populations. Even in such cases, the ecological impact may, therefore, be considerably larger than the smaller (although still considerable) number of impingement moralities suggests.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.206.107

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper, et al.

Flow and volume

Effects of volume pumped on fish impingement and entrainment

One of the key aspects that must be considered is the relationship between the number of organisms killed by impingement and entrainment and the location and size of the intake. It is apparent that within a single water body, the larger the volume pumped the larger the number of passively transported planktonic organisms that will be entrained. However, water bodies differ in their ecology and animal abundance and species differ in their preferred position within a water body, so it can be argued that the locality and position of the intake can have a large effect on the number of fish and other creatures captured. Living animals, particularly the larger fish and crustaceans that are powerful swimmers, do not behave like passive objects and thus their catch rate can vary in a non-proportional manner with the volume of water pumped. As will be shown below there is a clear tendency for catch rates to increase as a power function of the volume of water extracted, but there are some species that behave very differently. Wyman (1984) in a study of impingement at Lake Ontario power plants operating with different numbers of cooling water pumps found that species responded differently. Alosa pseudoharengus and Osmerus mordax were apparently attracted to the water currents entering the intake and were caught in greater numbers per unit volume as the volume pumped increased. This response has often been observed but is usually explained by increased intake velocities leading to more fish entering a zone where water speed exceeds their sustainable swimming speed. Morone americana, Morone chysops, Dorosoma cepedianium and Perca flavescens were caught at a constant rate per unit volume irrespective of flow and Micropterus dolomieui were caught in lower numbers per unit volume as flow increased. It was concluded that this latter species avoided faster flowing waters and was thus proportionately more vulnerable to intakes with a reduced pumping rate.

EPA Response

See response to comment 316bNFR.206.010.

Comment ID 316bNFR.206.108

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper, et al.

One of the most comprehensive studies of the relationship between the volume of water pumped and the number of freshwater fish impinged and entrained in power station cooling water systems was that undertaken by Kelso (1979) for direct-cooled power plants on the Great Lakes. They analysed entrainment and impingement rates separately. Using data collected from 37 power plants, the number of fish impingement per annum (I) was related to power plant generating output capacity in Megawatts (Mwe) by the regression equation:

log10(I) = 0.414 + 1.844 log<sub>10(Mwe).

The number of fish entrained per annum (E) was similarly related by the equation:

log10(E) = 2.103 + 1.658 log<sub>10(Mwe).

From this analysis they concluded that for entrainment: "The 'harvest' is apparently influenced more by plant size than location within the great lakes" and impingement: " in general there is a significant influence exerted by power plant size".

The output capacity and the rate of water extraction by direct cooled power stations is positively correlated, irrespective of plant design and Kelso (1979) gave the relationship between cooling water extraction rate (C) in m^3 s^-1 and capacity in Megawatts (Mwe) as:

C = -1.288 + 0.049 Mwe.

This empirically derived equation obviously cannot be used to extrapolate water usage for plants much smaller than those included in the dataset, as it would predict negative water use. However, it is sufficiently reliable to be used to predict fish impingement and entrainment mortality at the working power stations that were studied.

Combining the above equations and converting water flow to gallons per second (G) the following equations relate impingement and entrainment rates to flow:

log<sub>10(I) = 0.414 + 1.844 log<sub>10(G+340.25)/12.944) and

log<sub>10(E) = 2.103 + 1.658 log<sub>10(G+340.25)/12.944),

Antilogging and simplifying the above equations gives the power curves'

I = 0.023(G+340.25)^1.844 and

E= 1.816(G+340.25)^1.658

respectively.

EPA Response

See response to comment 316bNFR.206.010.

Comment ID 316bNFR.206.109

Subject Matter Code	11.2
Request for Comment: Considerations for Impacts Outside Littoral Zone	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

A clear example of the importance of the volume of water extracted on the number of fish impinged is given by Benda (1975) in a study of impingement at the Palisades Nuclear Power Plant, Lake Michigan, while operating with once-through and evaporative cooling tower closed cooling. The volume of water extracted in each mode was 8101 and 1226 gallons s^-1 respectively. Annual estimates of fish impingement were approximately 452,577 and 7,488 for once through and closed cycle respectively. However, the number of crayfish, Orconectes propinquis, actually increased (see above Benda, John et al. 1975).

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

The relative unimportance of locality when compared with the influence of the volume of water pumped was also found to be the case in a study of marine and estuarine direct-cooled stations. Henderson (1989) reported a study that examined the influence of locality on the rate of fish impingement for British direct-cooled coastal power stations. Quantitative data allowing the estimation of annual impingement was available for 9 power plants over a wide latitudinal and habitat range. The habitats in the vicinity of the intakes varied from upper estuarine to exposed coastal sites with offshore intakes. The results presented are summarised in Table 1. It was concluded that while the annual catch varied between stations by about two orders of magnitude, the catch of all species other than sprat (a shoaling clupeid), standardised for water volume pumped, was remarkably similar at between 1 and 5.8 x 10^5 individuals per annum per 30 m^3s^-1. Given the large between year variation in catches and the widely different sampling efforts used at each locality this suggests no appreciable difference in overall catch rate over a wide range of habitats and geographical position. The one exception was Wylfa power station, which was unique to having cooling water intakes in an exposed, rocky shore, habitat. If sprat, Sprattus sprattus, which is a clupeid fish that forms extremely large shoals was included, then the between power station catch would have been more variable. This is because stations with intakes on their migratory pathways or over-wintering grounds can occasionally catch extremely large numbers. Some marine direct-cooled power stations have experienced emergency shutdowns because the filter screens became clogged and failed because of the weight of sprat impinged. High temporal and spatial variability in catch rates linked to clupeid (herring family) abundance is also a feature of N. American marine and freshwaters.

Table 1 The total species and annual catch of individual fish as the sampled power station sites. The total excluding sprat and this value standardised to a pumping rate of 30 m^3s^-1 are also given. N/A indicates that quantitative annual estimates were unavailable.

Power Station	Estimated annual catch	Annual catch less sprat	Standardised catch for a pumping rate 30m3s-1 less sprat	Total species	Freshwater species
Wylfa	0.5 x 10^5	0.5 x 10^5	0.25 x 10^5	59	0
Heysham ‘A’	7.6 x 10^5	5.4 x 10^5	3.6 x 10^5	51	0
Berkeley	N/A	N/A	N/A	71	11
Oldbury	2.5 x 10^5	2.5 x 10^5	2.8 x 10^5	75	10
Uskmouth ‘B’	N/A	N/A	N/A	35	3
Hinkley ‘B’	12.3 x 10^5	11.0 x 10^5	7.6 x 10^5	77	0
Fawley	2.7 x 10^5	1.7 x 10^5	1.0 x 10^5	80	0
Dungeness ‘B’	11.4 x 10^5	6.85 x 10^5	4.8 x 10^5	79	0
Kingsmouth	9.9 x 10^5	9.9 x 10^5	4.6 x 10^5	59	5
West Thurrock	2.6 x 10^5	2.6 x 10^5	2.06 x 10^5	68	4
Sizewell	37.3 x 10^5	6.62 x 10^5	5.8 x 10^5	73	0

Blyth	N/A	N/A	N/A	48	0

An interesting feature noted by was that the number of species impinged varied consistently with latitude, with more northerly stations catching markedly fewer fish species. This would be expected, as species diversity is known to generally decrease with increasing latitude. However, while more northern stations caught fewer species they did not catch fewer individuals. This suggested that the average abundance of individuals in the water did not vary consistently with latitude. Productive northern waters had fewer species, but each of these species was part of a larger population. North American data shows a similar pattern with intakes situated in more northern, less species rich waters, still catching large numbers of individuals.

EPA Response

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. EPA disagrees with commenters that other factors influential to impingement and entrainment have been ignored. Both Track I and Track II of the final rule allow for site-specific evaluations in determining the appropriate technologies to be implemented. For example, the Design and Construction Technology Proposal Plan required in Track I and the Evaluation of Potential Cooling Water Intake Structure Effects in Track II allow for site specific consideration of factors other than flow to minimize impacts from impingement and entrainment. Cumulative impacts are addressed on a case-by-case basis by each permitting authority.

EPA expects that this final regulation will reduce impingement and entrainment at new facilities. The final rule establishes requirements that will help preserve aquatic organisms and the ecosystems they inhabit in waters used by cooling water intake structures at new facilities. EPA has considered the potential benefits of the rule; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures. The preamble discusses these benefits to the extent possible in qualitative terms.

Comment ID 316bNFR.206.111

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper, et al.

Subject Matter Code 12.0
Best Technology Available-Flow and Volume

Since the publication of Henderson (1989) considerably more information on impingement on Northeast Atlantic direct-cooled power stations has become available. Table 2 presents estimated annual impingement at 18 coastal power stations ranging in location from Northern France to Northern Ireland. These data were extracted from a wide variety of original reports. As was found for the freshwater fish fauna of the Great Lakes, the rate of fish impingement increases with the volume of water pumped and the relationship can usefully be described by a power function I = 9 x 10^-7 G^3.055 where G is the pumping rate in gallons per second and I is the number of fish impinged per annum. (When calculating this regression data for Wylfa and Torness were not included. The Wylfa data point was omitted because the site is highly atypical (a rocky exposed coastal locality) and Torness because insufficient data was available to give confidence that the annual impingement estimate was correct.)

The mathematical relationship between the number of fish impinged and the volume of water pumped for both the freshwater Great Lakes stations and the North East Atlantic marine and estuarine stations shows a similar mathematical relationship of accelerating rates of impingement with volume that is reasonably described by a power law. The impingement estimates in Table 2 are of similar magnitude to those observed at N. American intakes. For example, Indian Point, 2 & 3 and Roseton which are direct-cooled units on an estuarine site in the Hudson River impinge about 1 x 10^6 and 1.67 x 10^5 fish per annum. The above analyses lead to the general conclusion that pumping rate is considerably more important than locality and intake configuration in determining the number of fish either entrained or impinged.

Table 2 Estimated annual fish impingement at marine and estuarine power stations in the North West Atlantic

Power Station	Pumping rate m^3 s^-1	Pumping rate Gallons per day	Impingement Number per annum
Hinkley	30	6.85E+08	9.27E+05
West Thurrock	50	1.14E+09	1.76E+07
Sizewell A	34.2	7.81E+08	3.73E+06
Wylfa	68	1.55E+09	3.98E+04
Fawley	50	1.14E+09	6.00E+05
Oldbury	26.5	6.05E+08	1.76E+06
Heysham	30	6.85E+0	7.70E+05
Dungeness B	42.4	9.68E+08	1.10E+06
Hartlepool	40	9.13E+08	4.82E+06
Kingsnorth	64	1.46E+09	9.93E+05
Torness	50	1.14E+09	2.18E+04
Coolkeeragh	11.5	2.62E+08	1.73E+04
Ballylumford	29.4	6.71E+08	1.04E+05
Kilroot	16.6	3.79E+08	1.11E+05

Belfast West	9.1	2.08E+08	1.51E+04
Graveline	240	5.48E+09	2.16E+08
Dunkerque	21.2	4.84E+08	6.20E+05
Paluel	86	1.96E+09	1.35E+08

EPA Response

See response to comment 316bNFR.206.010, 206.110.

Comment ID 316bNFR.206.112

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

The choice of 2 to 30 million gallons per day thresholds

The proposed minimum daily flow of 2 million gallons per day (MGD) at which the regulations begin to apply is considerably smaller than the water volumes used by almost all direct-cooled power plants. As the rate of fish capture is directly related to volume pumped this proposal would ensure that all intakes at which extremely large numbers of fish would be entrained or impinged will be covered by the proposed regulations. A daily flow of 2MGD is sufficiently low, when taken together with limitations on the proportion of the volume of the source water that can be extracted, to ensure that all intakes likely to have an appreciable impact on the populations of aquatic life are included. However, there is no minimum flow that can be defined at which intakes can be designed to eliminate impingement and entrainment mortality. Given, for example, the flow-catch relationship found for the Great Lakes power plants by Kelso (1979), a 2 MGD intake would be predicted to result in 31,926 and 1,215 entrainment and impingement fish captures per annum respectively. Planktonic organisms will be caught by even the smallest intake as is apparent given the use by biologists of pump samplers which will only remove a few hundred gallons of water per sample.

At the top end of the proposed thresholds, a 30 MGD intake if poorly sited in a sensitive ecosystem has the potential to kill large numbers of entrained organisms.

The young stages of fish and other planktonic organisms can be highly aggregated and thus large moralities could be produced by a poorly designed cooling water system. Aston & Fleming (1992) report a study of entrainment of juvenile fish at riverine British power plants with evaporative cooling towers or low flows. The results presented in Table 3 below show that Didcot Power Station, with an evaporative cooling tower system and an intake flow of 27.9 MGD caught 12,418 juvenile, many cypinid, fish per day. Aston & Fleming (1992) considered that the reason why no juveniles were entrained at Ironbridge was linked to the positioning of the intakes in waters not used by juveniles.

Table 3 Entrainment of juvenile fish at British power stations on rivers with low intake flows.

Power station	Intake flow MGD	Entrainment rate, numbers per day
Staythorpe B	220	50,828
Castle Donington	43	1,792
Ironbridge	15.8	0
Didcot	27.9	12,418

EPA Response

EPA chose the two MGD threshold because this threshold addresses the majority of new facilities and therefore provides the States and Tribes with a national rule that can be easily applied to a majority of permitting decisions they face in order to implement the legal requirements of CWA section 316(b). those new facilities with withdrawals that are at or below a two MGD threshold will generally be

smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ.

EPA agrees that poorly located or designed intakes can result in harmful impacts. Thus, the final rule imposes BTA requirements on intake flow, velocity, proportional flow (based in part on location), and design and construction (also location sensitive) to ensure impacts are reduced. Further, Track II allows flexibility to use alternative technologies to achieve the required performance level, which also promotes the use of less sensitive locations in combination with optimized controls.

Comment ID 316bNFR.206.113

Subject Matter Code	12.1
Freshwater Streams/Rivers	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Flow restrictions based on size of source waterbodies

For flowing freshwaters it is proposed that the maximum intake flow be the minimum of 5% of the average annual flow or 25% of the stream 7Q10. The EPA estimates that this proposal taken in conjunction with the other constraints will result in the protection of greater than 99% of the aquatic fauna. EPA does not support this claim, and the number of animals killed would depend on the distribution and behaviour of the organisms as well as the floe withdrawn and the variation in river flow.

The flow of most US surface waters is highly seasonal and varies considerably between years so it is likely that the 7Q10 minimum constraint will often determine the upper limit for extraction. In drought years this constraint would effectively allow a reduction in the level of environmental protection over that offered in more typical periods. Over the usual life of a power plant of 40 years or more it is likely that there will be periods when flow is lower than the 7Q10 and thus, for short periods, even more than 25% of the flow could be removed. The problem from the ecological viewpoint with this proposal is that during extreme droughts, when the aquatic life is already stressed, the impact from water extraction (and discharge) would be particularly high. This could result in considerable ecological damage from which it might take the river fauna a number of years to recover. Indeed, recovery might not be complete before the next drought occurs so that the net result is a gradual degradation of the fauna. The proposal thus offers no guarantees that the 99% level of protection can be achieved, and offers no support for continuing to develop once-through cooling systems.

For long-lived members of the aquatic community and organisms with limited powers of dispersal it may be conditions during periods of drought that determine the long- term suitability of the habitat. A possible way in which the constraint could be made more ecologically meaningful would be to replace the once in 10 years 7 day mean minimum flow by a once in the designed life of the plant 7 day mean flow. Alternatively, and far more protective, would be an upper limit on the proportion of the flow that could be extracted irrespective of the flow so that during droughts very little water could be removed. In many localities this might require the installation of dry cooling or other low water usage technology to ensure continuity of operation.

EPA Response

While EPA believes this final rule will significantly increase protection for aquatic communities, the Agency has determined that the proportional flow requirements represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA rejected dry cooling for reasons discussed in the preamble and elsewhere in this comment response document. EPA examined the performance of existing facilities based on data from the section 316(b) industry survey in terms of proportional flow to determine what additional value could be used as a safeguard to protect against impingement and entrainment, (especially in smaller waterbodies,

where multiple intakes are located on the same waterbody, or in waterbodies where the intake is disproportionately large as compared to the source water body). EPA found most existing facilities meet these requirements. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet these requirements. EPA recognizes that some measure of judgment was involved in establishing the specific numeric limits in these requirements and that these requirements are conservative in order to account for multiple intakes affecting a waterbody. In particular, the 1 percent value for estuaries reflects that the area under influence of the intake will move back and forth near the intake and withdrawing 1 percent of the volume of water surrounding the intake twice a day over time would diminish the aquatic life surrounding the intake. The 5 percent value mean annual flow reflects an estimate that this would entrain approximately 5 percent of the river or stream's organisms and a policy judgment that such a degree of entrainment reflects an inappropriately located facility. Nevertheless, because they address important operation situations and appear to be achievable for new facilities, EPA believes they are appropriate to this rule.

EPA did not adopt the commenter's approach regarding a limit to the proportion of the flow during droughts since such actions may have implications for energy reliability, that is it may affect energy supplies/availability during periods of peak energy demand. The use of percentages of average annual flow or 7Q10, as prescribed in the rule, is a more indicative approach for a national design standard.

Comment ID 316bNFR.206.114

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Subject Matter Code 12.2

Lakes/Reservoirs

For static freshwaters, it is not proposed to place any constraint on extracted flow in relation to water body volume. It is argued that these are unnecessary because of design constraints that require water bodies to be large enough to act as cooling ponds. In general, heat is lost from the free surface of a water body, but the ecological impact of an intake will be related in some degree to the volume of the water body. Thus a shallow and deep lakes of similar surface area might be able to dispose of similar amounts of waste heat. However, the ecological impacts of water extraction could be considerably different. The deeper water bodies that normally become stratified are given some protection by the stipulation that their natural stratification must be maintained. However, this proposal is rather poorly defined and may not be as protective as intended. It is not the physical presence of thermal stratification, but the way in which it influences aquatic life that is important. Waters that become stratified tend to have a limited movement of oxygen and nutrients between the upper and lower layers. It is this restricted flux that creates the aquatic conditions that lead to characteristic communities in stratified waters. However, if the intakes are taking water from close to the bed of a lake, modifying it during passage through a cooling water system and discharging at the surface then it is possible to envisage situations where the thermal stratification is maintained but an unnatural nutrient flux is created. This could have a similar net effect on the plankton as a breakdown in stratification. It would possibly be more ecologically meaningful to propose that cooling water systems should not change to an appreciable degree the vertical nutrient and oxygen gradients in a static water body. For shallow lakes and reservoirs it is possible to remove a volume of water sufficient to influence the aquatic community while maintaining cooling capacity. There are indeed known examples where the ecology has been sufficiently altered to even raise concerns about dangers to human health because conditions have been made favourable to unnatural pathogens. For example, an amoeba pathogenic to humans, Naegleria fowleri, which causes amoebic meningoencephalitis has been reported from thermally polluted lakes in both the USA and Europe (Langford 1990). Not only does this suggest an alteration in the ecosystem in favour of heat-loving forms, but their control can be difficult and result in further ecological damage. Finally, as noted, there is no indication that limiting cooling water withdrawal so as to maintain lake stratification or to ensure adequate cooling prevents substantial entrainment or impingement of fish, ichthyoplankton or other aquatic biota.

EPA Response

It is important to note that discharges and their potential thermal impacts are not regulated under Section 316(b) or this rule. It is also important to note that the final rule includes revisions under the proportional flow requirements for lakes and reservoirs, to consider cases where natural stratification does not occur and/or where stratification and turnover may not be ecologically significant. The final rule states that for cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water, except in cases where said disruption is determined to be beneficial to the management of fisheries for fish or shellfish.

Comment ID 316bNFR.206.115

Subject Matter Code	12.3
	Estuaries/Tidal Rivers

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

For tidal rivers and estuaries it is proposed to restrict intake flows to no greater than 1% of the volume of the water column in the area centred about the intake with a diameter defined by the distance of 1 tidal excursion at the mean low water level. There are a number of features about this proposal that need consideration. First, the regulation, as proposed, does not stipulate the time period over which the flow is measured. Is it the flow over a tidal cycle that must be less than 1% of the estuarine volume over the tidal excursion distance? In 125.83 the Design intake flow is defined as the total volume of water withdrawn over a specific period. Without a clear definition of this period the proposed limitation is meaningless. However, the implication is that no more than 1% of the total volume over a tidal excursion of ebb and flood tide can be removed. This is the volume withdrawn over approximately 12.5 hours, or 1.92% per day. It is also worth noting that the proposal is confusing as it defines tidal excursion in a manner that is different from general usage, so as to double the flow limit it would allow.

Using this assumption we can now consider how lax the proposal is. As an example consider a hypothetical estuary with features similar to the Hudson River. The average current velocity on flood and ebb tides is 0.38 ms^-1 so that the tidal excursion (as defined in the proposal) is 0.38 x 6 x 3600 x 2 m = 16416 m. Now the average depth is 25 m and the width of the estuary 2000 m so that the total volume of the area proposed is 16416 x 25 x 2000 = 8.2 x 10^8m^3. Therefore 1% of this volume is 8.2 x 10^6 m^3. We use the complete width of the estuary in this calculation because it is much smaller than 16416 m.

The maximum flow that would be allowed in our hypothetical estuarine intake would be 8.2 x 10^6 x 2.2 x 10^-5 = 180 m^3s^-1. A once-through cooling water system for a 1000 MW power plant requires about 30 m^3 s^-1. If we have understood the proposal correctly, the proposed restriction is effectively no restriction at all. Even if the proposal were for a daily flow of no more than 1% of the tidal excursion volume this would still give an allowed flow of about 90 m^3 s^-1 which can hardly be considered conservative. Given that flows at estuarine sites cannot exceed that required by a closed cycle system the proposed restrictions would have no meaning for an estuary such as the Hudson.

Given that flows at estuarine sites cannot exceed that required by a closed cycle system the proposed restrictions would have no meaning for an estuary such as the Hudson. The above example is by no means a worse case as our hypothetical Hudson type estuary is far narrower than many and in some situations the volume would be calculated for a half circle are of water centred on a shore intake.

EPA Response

In today's final rule, EPA has adopted a design intake flow criterion for facilities located on an estuary or tidal river which limits intake capacity to 1% of the volume of water defined by the distance of one tidal excursion from the opening of the intake structure. EPA believes the standard is appropriate and economically feasible for new facilities electing to withdraw water from an estuary or tidal river.

EPA is not establishing a daily, monthly or annual intake limitation for facilities located on an estuary or tidal river because the movement of tides, and the length of the tidal cycle, varies from region to region. Rather, the 1% limitation in today's final rule applies to the volume of water present in the water column during each tidal cycle (defined as the length of time between the maximum ebb and maximum flood). As the commenter notes, areas of the northern Gulf of Mexico typically experience diurnal (daily) tidal cycles as opposed to the semi-diurnal (twice daily) cycles that are typical of the Atlantic coast. Regional differences do not need to be addressed because the tidal information published by the National Oceanographic and Atmospheric Administration accounts for any tidal variation. If the commenter were to estimate the tidal excursion distance using the simplest method discussed at 65 FR 49098, no special steps would need to be taken to address any regional difference in the duration of the tidal cycle.

In addition to variability from region to region, tidal data at a given site are not the same from year to year due to the relative locations of the sun and moon as well as other poorly understood factors. The most accurate estimate of maximum ebb and maximum flood values at a given point would involve 18.6 years of data. For the purposes of today's final rule, EPA believes the marginal increase in accuracy this data would provide is unnecessary. EPA does not believe the variability in tidal cycles from year to year presents any obstacle to implementation of the standard. EPA recommends using the most recently published tidal data available from NOAA.

While EPA presented three methods for calculating the tidal excursion, most new facilities sited on an estuary or tidal river will likely opt for the simplest method mentioned above. Calculation of the tidal excursion using this method requires no specialized training and nautical information and tide charts are readily available for all areas of the US. EPA recently used this method to calculate the tidal excursion for existing facilities that submitted information under EPA's survey questionnaire and was able to complete the exercise for 97 of the 103 facilities. The remaining six could not be completed for reasons unrelated to the method of calculation.

EPA is unaware of any estuary or tidal river with the characteristics described by commenter (2000m wide with an average depth of 25m). EPA recently performed a tidal excursion analysis on three Hudson River facilities with average depths of 6, 10 and 9 meters. In fact, EPA could not locate any area of the Hudson River with an average depth approaching 25m in a 2000m wide segment. While depths of 25m are possible in estuaries, especially in shipping channels, an average depth of this magnitude is unlikely. Even if the above values were valid characteristics of a particular estuary, it would be unlikely this estuary would have an average current velocity of 0.38m/s. Such velocities are typically characteristic of narrower and shallower waterbodies, which must channel a large volume of water in a more confined area. Very wide and very deep estuaries typically disperse the volume of water over a greater area, resulting in a lower current velocity.

Comment ID 316bNFR.206.116

Subject Matter Code	13.0
Best Technology Available-Velocity	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper, et al.

Velocity

It is proposed to limit the maximum intake velocity across the intake screens to 0.5 feet per second as a means of reducing impingement and entrainment mortality. Our focus when considering this proposal is the biological relevance of the proposed velocity and its means of calculation. A number of potential problems with the proposal can be identified which will be addressed in turn below.

The proposed maximum intake velocity will be the calculated velocity across the filter screen or at the point of extraction. It is possible to envisage situations where the calculated velocity is considerably different from the maximum velocity that actually occurs. For example, filters can become partially blocked by debris, sediment or fouling organisms so that higher than calculated velocities occur across the available surface. This can occur on designs where screening occurs at the point of water intake using devices such as wedge-wire screens. Even on rotating drum or band screens the fouling by pond and seaweed, leaves and colonial animals can result in higher than predicted velocities across the screen. Tidal and river flows can also result in widely differing flow rates at different parts of an intake structure. In intake designs where the filter screens are situated on land, perhaps hundreds of yards from the water intake point, animals can enter the system and may even live within it for considerable periods. However, they are doomed because they cannot make their way out and the velocity across the filter screen is of little relevance. In such designs the intake can act almost like a pit-fall trap and even animals that can easily swim from the intake may enter because they do not recognise the danger. One offshore intake in Britain, for example, with intake velocities close to the levels proposed has been observed to catch seals that had to be rescued from the filter screen wells.

For any fish or planktonic organism there are 3 issues that will determine whether it will escape from entering an intake protected by a filter screen for which the mesh size is greater than the minimum dimension of the organism.

1. Detection -It must notice that it is being drawn in. Visibility and the ambient light and other cues such as sound, touch, turbulence and pressure affect detect ability of intakes.
2. Speed- Once the screen has been detected, for an organism with an ability to swim, it must have the speed to escape.
3. Direction -The direction of the intake flow can be critical. For example the flow must be horizontal to allow fish to react. Vertical flows are unnatural for most species and thus they will not react.

EPA Response

The final rule requires weekly visual or remote inspections to ensure that any technologies that have been implemented for minimizing adverse environmental impact are being maintained and operated in a manner that ensures that they function as designed. These inspections will also provide an opportunity to inspect intake structures for biofouling and will serve to keep the intake structures clear

of fouling organisms and debris, thereby maintaining the design intake velocity at the level consistent with protection of aquatic communities. Also, the Agency is aware that some intake technologies are designed to initiate an automated cleaning procedure (such as an air burst or the rotation of a traveling screen) that will maintain a clean intake surface.

As the commenter notes, fish behavior is one of multiple factors that may affect impingement and entrainment at a given intake. However, in today's rule, EPA has established a highly protective intake velocity requirement that is intended to minimize or even remove any need to consider avoidance behaviors of the various species and site-specific conditions that may affect those avoidance behaviors. Given the data EPA has seen on the protective nature of the 0.5 ft/s requirement (see DCN #2-028 in the Docket for the rule), EPA concluded that there is no significant potential for entrapping fish. Consequently, Track I of the final rule continues to specify design through-screen velocity as the measure for determining compliance with the velocity requirement. As this data shows, most fish can escape a 0.5 ft/s intake velocity. Therefore, even if the fish does not quickly or readily detect the intake, it still has every opportunity to escape the intake structure. EPA also notes that facilities wishing to employ developmental technologies may follow Track II and demonstrate an equivalent level of protection. Additionally, under § 125.86, the Director may require additional controls to complement the protection afforded by the velocity requirement.

Comment ID 316bNFR.206.117

Subject Matter Code	13.0
Best Technology Available-Velocity	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

The detection of intakes by fish

A variety of cues help fish to detect intakes. They can detect turbulence in the water in the vicinity of the intake. Large-scale turbulence (relative to body size) is recognised by the labyrinthine receptors detecting the movement of the whole body. The lateral line organ detects small-scale turbulence. Large-scale turbulence in tidal waters will tend to be on the down-tide side of the intake whereas most water (and fish) will enter the intake on the up-tide side. Small-scale turbulence is therefore likely to be more important for detection of intakes by fish.

Fish tend to head up into the faster current if they cross a shear line between two currents. This should result in the fish orientating itself away from intakes if it has crossed a shear line. However, there are only shear lines at the edge of the intake area.

Light has an important effect on the ability a fish to detect and orientate with respect to an intake. Fish catches have been shown to increase significantly at night (Grimes 1975; van den Broek 1979). Intakes positioned in high turbidity waters or below the photic zone, frequently do not show diurnal variation in fish catches, but can be particularly lethal to fish. This last observation is important given the proposal to require less stringent levels of protection at sub-littoral intakes, which by definition are in areas of low light.

EPA Response

See response to comment 316bNFR.206.116 for information on avoidance behaviors of fish at intakes.

Comment ID 316bNFR.206.118

Subject Matter Code	13.0
Best Technology Available-Velocity	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Swimming speed and intake velocity

There are two common measures of fish swimming speed, burst speed and maximum sustainable swimming speed. Burst speed is produced by white muscle and creates an anaerobic debt. This debt is costly to the fish and can take 24 hours to repay (Batty & Wardle, 1979). Sustainable swimming speed is produced by the red muscle and is maintainable by the fish for extended periods of time without any oxygen debt.

Although many fish have the ability to out-swim the flows found in and close to intakes, it is far from clear that a fish will escape from an intake using burst swimming. Evidence suggests that they will use steady sustained swimming speeds (Turnpenny 1983). Behaviour in front of intakes appears to be similar to the behaviour in front of trawls (Blaxter and Parrish 1966; Turnpenny 1983), where fish can be observed swimming steadily in front of the mouth of the net but not escaping it. The fish have the ability to escape but do not as the right stimuli are not present. When the stimuli are applied (i.e. a diver trying to catch the fish by hand) the fish uses its burst speed and easily leaves the net mouth. This tendency to hold station in front of a net or intake can have an impact on the local ecology as intakes are frequently used as hunting grounds by large predatory fish and occasionally birds which find it easy to take steadily swimming, but static, little fish.

Species vary in the proportion of red and white muscle mass present, and this can be used to make general predictions about performance. There are four main groups. Pelagic fish -the fastest swimmers and this group includes Scombrids and Clupeids (herrings). Proximo-benthic fish- modest swimmers this group including the codfishes and flatfish. Benthic species -a group which have no sustained swimming speed and includes gobies, blennies, pipefish and clingfish. Finally anadromous species -these fish tend to be good swimmers as required by their protracted migrations, examples include salmon and shads. It is interesting to note that, despite their swimming performance, pelagic fish are frequently the most abundant forms entrained and impinged. In contrast, benthic fish, particularly forms such as the clingfishes, which have no sustainable swimming ability are rarely caught. Evidently, swimming speed alone does not ensure escape or avoidance.

Within a species swimming speed can be influenced by a number of factors including physiological condition, size and water quality. Amongst adults, speed varies proportionately to body length. This relationship does not hold over the complete size range of a species; small fish can generally swim at a higher number of body lengths per unit time than the adult. Brett (1964) showed that the oxygen requirement of the pacific salmon increase logarithmically over the temperature range of 5-15°C after which the sustained swimming speed started to reduce as oxygen limitation came into play. Similarly, Turnpenny (1983) found that temperature and body size also affected the sand smelt sustained swimming speed. Thus, swimming speed can vary seasonally and has been used to explain the frequently observed fact that more fish are impinged during the winter. In very cold winters it is possible that an intake that fish are normally easily fast enough to avoid may become lethal.

EPA Response

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

See response to comment 316bNFR.206.116 for information on avoidance behaviors of fish at intakes.

These data were compiled from over 120 species and represent a broad cross section of fish species, each with different swimming abilities. These data provide a comprehensive basis for the velocity requirement, as a given facility is more likely to be co-located with multiple species, as opposed to limiting the velocity requirements to a single species in a species-specific approach. However, EPA notes that if the permit applicant does not want to meet the specific Track I velocity requirement, the applicant can, under Track II, conduct site-specific studies and seek to demonstrate equivalent protection from impingement and entrainment.

EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement. As such, today's rule can not account for every site-specific contingency at any given plant nor the fate of an individual fish. Under § 125.86, the Director may require additional controls (such as requirements for water temperature, oxygen levels or the timing of spawning seasons) to complement the protection afforded by the velocity requirement.

Direction and the flow characteristics of the screen.

If the flow entering a screen is not perpendicular to the screen it can affect the ability of the fish to escape. Arnold (1974) found that fish orientate at 90 degrees to the screen even when the flow is coming from a different angle. This will have the effect of reducing the effective sustained swimming speed of the fish. Therefore, design velocities for fish escape should be computed as the velocity vector normal to the bars of an intake and not along the streamline.

In canalised intakes, the speed of the water can be higher in restricted parts of the canal than at the coarse screens. This can lead to fish becoming impinged after tiring themselves in the faster canal area before encountering velocities at the coarse screens that they should have been able to escape.

Flows which are not horizontal are much more difficult for fish to deal with. Capping of intakes to cause the flows to become more horizontal have been shown to reduce screen catches. During the early life of Dungeness B, on the south coast of the UK, a comparison of the capture rates of the A and B station were made (Spencer and Fleming 1987). While the two stations use the same intake structure, the B station has a velocity cap fitted. It was found that the B station catch was reduced by 62% when compared with that of the A {Table 4). This large decrease was largely due to the reduction in sprat impingement.

Table 4 - The number of fish caught at Dungeness A and B during one years sampling 24hr samples on 1 filter screen at each station. (10 months used)

	Dungeness A	Dungeness B	% Decease
No. of fish caught	88428	32813	62

There were some problems with this study as three cooling water pumps were running at the A station and only one at the B station. The increase in fish impingement when all four pumps of the B station are running is unlikely to be linearly related to volume pumped and thus the velocity cap may not be as advantageous as these observations suggest. Factors including the velocity around the intake, fish swimming speeds and turbulence effects would come into play. The effects of tides and currents on intakes flows are significant. As the tide or current reaches its maximum rate the flow is often at its least normal to the intake structure and leads to higher catches. Such currents also often cause high peak flows in certain areas of the intake.

EPA Response

See response to comment 316bNFR.001.001 for information on the intake configuration.

Given the data EPA has seen on the protective nature of the 0.5 ft/s requirement (see DCN #2-028 in

the Docket for the rule), EPA concluded that there is no significant potential for entrapping fish. Consequently, Track I of the final rule continues to specify design through-screen velocity as the measure for determining compliance with the velocity requirement.

EPA also notes that the intake velocity requirements are based upon the design through screen velocity. Due to the amount of open space in an intake screen face, a 0.5 ft/s through screen velocity will effectively reduce approach velocities to values lower than 0.5 ft/s. As such, the velocity in the vicinity of the intake will be further reduced, affording poor swimming fish an additional safety margin to escape an intake flow.

EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement. As such, today's rule can not account for every site-specific contingency at any given plant nor the fate of an individual fish. Under § 125.86, the Director may require additional controls (such as requirements for water temperature, oxygen levels or the timing of spawning seasons) to complement the protection afforded by the velocity requirement. Additionally, the Director may require controls on the direction of flow (both vertically and horizontally) should the situation merit such controls. EPA also expects that applicants will propose appropriate technologies and avoid well-known design flaws such as uncapped intakes with significant vertical flows.

Comment ID 316bNFR.206.120

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Subject Matter Code 13.1

Requirement of 0.5 fps

Which fish cannot sustain 0.5 feet per second?

The above observations make it clear that it is impossible to define with any precision a particular intake velocity that gives effective protection to all fish. We now go on to consider if 0.5 ft per second is a reasonable value. Table 5 shows the experimentally obtained maximum cooling water intake velocities at which fish of different species and age can escape (Turnpenny 1988). The results were calculated for different water temperatures. The figures in bold in Table 5 are below the suggested maximum velocity of 0.5 feet per second. It is notable that the majority of species as young-of- year (0 group) are unable to sustain 0.5 feet per second at temperatures around 2.5°C. This suggests that the swimming speed maximum value would be too high for many North American waters during the winter. It might be more appropriate to develop a maximum intake velocity criterion that included temperature and possibly oxygen also.

As entrainment of larval fish is of particular concern the ability of larval fish to escape from intake water streams is of particular interest. Table 6 gives the highest escape speeds for the larvae of herring, cod and flounder. It can be seen that no post-yolksac larvae are able to achieve even a burst speed of 0.5 fts^-l.

Table 5 - The maximum approach velocities that will enable fish to escape at different water temperatures. (Turnpenny 1988)

	Age Group O and older				Min Length	Age Group 1 and older			
Temp ºC	2.5	7.5	12.5	17.5	Age 1	2.5	7.5	12.5	17.5
Species	ft s-1				inches	ft s-1			
Sprat	0.984	1.313	1.64	1.968	3.15	1.64	2.099	2.559	3.018
Herring	0.984	1.313	1.64	1.968	4.72	1.64	2.133	2.625	3.084
Cod	0.492	0.984	1.313	1.805	5.91	0.984	1.706	2.428	3.117
Whiting	0.328	0.82	1.313	1.64	5.91	1.148	1.804	2.592	3.346
Pout	0.262	0.492	0.656	0.951	7.87	1.115	1.968	2.723	3.445
Poor Cod	0.328	0.82	1.148	1.64	3.94	0.853	1.313	1.936	2.395
Plaice	0.262	0.492	0.656	0.984	3.15	0.919	1.575	2.198	3.018
Flounder	0.328	0.656	0.984	1.313	4.72	0.919	1.509	2.165	2.822
Dab	0.066	0.328	0.656	0.853	3.94	0.394	0.755	0.115	1.509
Sole	0.164	0.492	0.656	0.984	4.33	0.722	1.313	1.87	2.362
Bass	0.656	1.148	1.64	2.165	3.54	1.214	1.937	2.725	3.578
Grey Mullets	0.656	1.148	1.64	1.968	3.94	0.984	1.64	2.265	2.922
Sand Smelt	0.328	0.656	0.984	1.313	2.76	0.788	1.313	1.74	2.297
	Age Group 1 and older					Age Group 2 and older			
Salmon Smolts	1.476	1.968	2.297	2.625	5.91	1.804	2.231	2.592	2.986

Table 6 - Clupea harengus, Gadus morhua and Platichthysjlesus. Highest escape speeds (fts^-1) during starvation (BLs^-1 given in parentheses). Speeds are means ±95% confidence limits (Converted from (Yin and Dlaxter 1987).

	Probe		Pipette	
	max	mean	max	mean
Yolk-sac larvae				
Clyde Herring	0.443±0.069	0.217±0.062	0.499±0.043	0.24±0.033
	(13.2±2.1)	(6.5±1.9)	(14.9±1.3)	(7.2±1.0)
Baltic Herring	0.423±0.039	0.197±0.013	0.456±0.043	0.203±0.03
	(14.9±1.4)	(6.9±0.8)	(16.1±1.5)	(7.5±1.2)
Cod	0.226±0.023	0.118±0.016	0.262±0.026	0.141±0.016
	(13.2±1.3)	(6.9±1.4)	(15.1±1.5)	(8.6±1.0)
Flounder	0.184±0.03	0.098±0.02	0.213±0.049	0.115±0.03
	(13.0±2.1)	(6.9±1.4)	(15.1±3.5)	(8.1±2.1)
Older Larvae	Clyde Herring			
36 d-old	0.577±0.135	0.269±0.075	0.643±0.079	0.328±0.046
	(12.1±2.8)	(5.7±1.6)	(13.5±1.6)	(6.9±1.0)
60 d-old	0.81±0.161	0.417±0.095	0.84±0.128	0.476±0.049
	(13.0±2.6)	(6.7±1.5)	(13.5±2.0)	(7.6±0.8)

The situation with respect to larval escape cannot be much improved by reducing intake velocities further because there is little evidence that larvae upon detecting the flow of water will dart in a direction that will ensure their escape. Table 7 shows the number of larvae of herring, cod and flounder that moved away (A), towards (I) or in some other direction (A/T) when stimulated by a sudden flow of water. As can be seen, a considerable proportion actually moved towards the point at which water was being withdrawn.

Table 7 Clupea harengus, Gadus morhua and Platichthysjlesus. Numbers of larvae turning away from (A), towards (T) and aligned with (Arr) a point of stimulation (probe or pipette) during early development (Yin and Blaxter 1987).

	Probe			Pipette		
	A	T	A/T	A	T	A/T
Clyde Herring	57	31	16	108	63	46
Baltic Herring	42	18	5	89	34	17
Cod	69	33	10	72	31	16
Flounder	37	25	30	48	26	21
Total	205	107	61	317	154	100
Percent	54.95979	28.68633	16.35389	55.51664	26.97023	17.51313

	Away	Not Away	Away	Not Away
Total	205	168	317	254

Percent 54.95979 45.04021 55.51664 44.48336

A summary of the problems with the 0.5 feet per second criterion

1.Fish often do not know in which way to swim and so may become entrained or impinged even if they have the speed to escape.
2. There is no mention of the direction of flow relative to gravity; horizontal flows are less dangerous than vertical flows. (Intake capping is mentioned as a possible remedial measure).
3. There is no consideration of the effect of tide, currents etc. on flow rates though screens.
4. There can be problems because fish orientate at 90 degrees to the screens not the flow.
5. The velocity is determined at the screens -at this point the fish may already be trapped.
6. Temperature effects are not mentioned -at 2.5 °C most young temperate water fish are unable to sustain 0.5 ft/s.
7. Evidence suggests that the effect of high temperatures might limit oxygen and therefore reduce the sustainable swimming speed of fish.
8. Fish eggs are often free floating and are therefore vulnerable to entrainment irrespective of intake velocity.
9. Larval fish, post-larval fish and very young fish are poor swimmers and many cannot achieve 0.5 ft/sec. They also do not all react to a flow by moving away from it.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

In the final rule, EPA has adopted a single national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement. As such, today's rule can not account for every site-specific contingency at any given plant nor the fate of an individual fish. Under § 125.86, the Director may require additional controls (such as requirements for water temperature, oxygen levels or the timing of spawning seasons) to complement the protection afforded by the velocity requirement. Additionally, the Director may require controls on the direction of flow (both vertically and horizontally) should the situation merit such controls. EPA also expects that applicants will propose appropriate technologies and avoid well-known design flaws such as uncapped intakes with significant vertical flows.

EPA also notes that the intake velocity requirements are based upon the design through screen velocity. Due to the amount of open space in an intake screen face, a 0.5 ft/s through screen velocity will effectively reduce approach velocities to values lower than 0.5 ft/s. As such, the velocity in the vicinity of the intake will be further reduced, affording poor swimming fish an additional safety margin to escape an intake flow.

See response to comment 316bNFR.206.116 for information on avoidance behaviors of fish at intakes.

EPA concurs with the commenter with respect to entrainment of eggs at intakes. Eggs are incapable of escaping intake flows, regardless of intake velocity. However, the velocity requirement included in

today's rule is not intended to address entrainment. The final rule includes capacity requirements to address the potential for entrainment. The intake velocity requirement is intended to minimize adverse environmental impacts due to impingement.

Comment ID 316bNFR.206.121

Subject Matter Code	17.0
Best Technology Available-Technologies	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Techniques to maximise survival of impinged fish

These include fish diversion, handling and return systems, each of which will be considered in turn.

A variety of methodologies have been tried to divert fish from entering intakes including, bubble curtains, sound barriers, lights, louvers, electric fields and other methods that scare fish away. At best they have been partially successful and are almost inevitably somewhat species specific in their effectiveness. At worst, they can actually increase the catch of some fish. For example, a sound deterrent system installed at Hinkley Point B Power Station had the effect of increasing the impingement of sprat (a small member of the herring family). This was possibly because when the fish heard the sound their natural fright reaction was to dive downwards, which resulted in them moving towards the intake. Tests with lights and bubble curtains have frequently found them to be almost totally ineffective. Perhaps, the most effective diversion device for rivers is a louver screen system. However, even these can only be partially successful and will not divert larval and weakly swimming fish.

Fish handling and return systems include pumps, lifts and sluicing systems and are best viewed as rescue methods of last resort to save impinged fish. They can never be completely effective as impinged fish suffer damage when they come into contact with surfaces, particularly the filter screens, and they are often disorientated and exhausted and thus may not recover when returned to their native water. Damage following contact with surfaces is particularly severe for clupeids and pelagic fish in general, which are by far the most abundant group of fish impinged on power station intakes. They often suffer scale loss and subsequently die due to exhaustion and osmotic shock.

EPA Response

EPA understands that there are limitations to some technologies and that they may not be appropriately applied to all facilities to meet the requirements of the new facility rule This rule was specifically written to allow site-specific determinations by the facility itself as to which technologies would be most appropriate based on their knowledge of conditions at the facility and in the waterbody.

Comment ID 316bNFR.206.122

Subject Matter Code	17.0
Best Technology Available-Technologies	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Technologies that minimise fish impingement and entrainment

Two major technologies are suggested as mitigation methods, Gunderbooms and similar fine screens, and passive intake structures such as wedge wire screens. The applicability of each will be considered in turn.

The Gunderboom as an entrainment mitigation device.

The Gunderboom is constructed from a fine mesh material that can potentially be deployed as a curtain or a series of panels around an intake. Since 1995 a Gunderboom has been tested at the Lovett generating station on the Hudson River at Tompkins Cove, NY. The basic idea is to surround the intake in a large surface area of fine filter material through which the cooling water will pass at a low velocity. Ichthyoplankton will not pass across the barrier. The only information on which to base the applicability of the Gunderboom technology are the reports arising from the experimental deployment at Lovett. In laboratory and short-term field trials there can be no doubt that a Gunderboom can reduce fish entrainment. However, as will be described below we have considerable reservations as to the longer-term utility of this technology. At present, it is best considered a technology that might be applicable in particular, specialist circumstances.

A Gunderboom for even a quite small cooling water intake requires a large surface area, which is resistant to flow and is vulnerable to physical damage. They would therefore be unlikely to be deployable in exposed marine or lower estuarine sites where there is powerful wave action or strong currents or water flows. The dragging of the anchors, over-topping of the boom and a rupture in the filter material, which were all experienced at Lovett, are typical of the types of operating problems that would be expected. Similar problems would be expected in flowing freshwaters that receive storm waters or large lakes with appreciable wave action. Such problems would be anticipated irrespective of whether the filter material was attached to a boom or installed in fixed panels.

The fine pores in the filter screen are highly vulnerable to becoming blocked. At the Lovett experimental deployment, sediment was removed from the filters by the use of an air bubble system. Such a system would be highly unlikely to work in the high turbidity estuarine waters that are found in areas with powerful tides and soft substrates. Further, it was pointed out during the trials that the bubble cleaning system was unable to remove algae and other fouling organisms from the filter. From experience with porous tubes used to produce bubble curtains it is known that biofouling is a considerable problem and in many habitats we would anticipate that long-term deployment would result in appreciable blockage of the filter by bacterial, fungal and algal growths leading quickly to filter screen failure.

The Gunderboom was not tested in waters that, during a spring or autumn plankton bloom, can hold appreciable quantities of colonial planktonic algal and bacterial species such as Phaeocystis. These colonial organisms can form a gelatinous slime within which the individual cells live. They can make

the use of plankton nets impossible as they quickly block the mesh and a similar effect can be anticipated with a Gunderboom.

If a Gunderboom is to effectively reduce entrainment, it will need to be deployed for a considerable proportion of the year, for in many waters there are few months when eggs, larvae or juveniles of fish are absent. Such a long-term deployment has not yet been attempted and is likely to produce effects that have not been anticipated. It has been demonstrated that a clean filter surface will not lead to the death of eggs and larvae that are pulled against it. However, this may not be the case when the surface is colonised with a fouling community. A community that may come to hold animals that are prospering because they are feeding on small animals pulled onto the surface by the suction.

To summarise, the applicability of Gunderboom technology depends on the ability of the structure to withstand the physical forces to which it will be exposed, forces that will become greater as the filter becomes clogged. The failures experienced at Lovett do not inspire confidence that this can be achieved without unrealistic maintenance schedules. The trials at Lovett noted that the bubble cleaning technology was unable to remove algae from the filter. To afford useful protection to fish and other organisms the filter must be deployed for long periods and must therefore not become excessively fouled and blocked. The establishment of a biofouling community can have two effects. First, it will reduce filter capacity that may result in the failure of the screen. Even if the screen does not fail, there may form small regions with much higher velocities through which eggs and larvae are forced. Second, this community may include a range of predatory or pathogenic organisms that are present because they feed on the eggs and delicate larvae that are pulled towards the surface. Such possibilities have not yet been tested and lead us to conclude that the Gunderboom cannot be considered a tried technology for general use.

EPA Response

EPA believes that the gunderboom is a promising technology, but recognizes that it has not yet been fully demonstrated. See EPA's Technical Development Document for the rule. EPA understands that there are limitations to some technologies and that they may not be appropriately applied to all facilities to meet the requirements of the new facility rule. However, with a view to being technology-forcing and to accommodate emerging technologies, this rule was specifically written to allow site-specific determinations by the facility itself as to which technologies would meet the requirement under Track II to meet the performance of Track I technologies. Thus, if the Gunderboom could meet these requirements, it could be used to meet the requirements of the rule.

Comment ID 316bNFR.206.123

Subject Matter Code	17.0
Best Technology Available-Technologies	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

Passive systems -wedge wire screens -filter beds etc

Wedge wire screens typically have a 0.5-2.0 mm slot mesh and can almost eliminate juvenile and adult fish deaths on intakes. However, they do not eliminate all entrainment (most planktonic crustaceans, including the larvae of fish, shrimps and crabs plus planktonic algae will be entrained) and they are subject to sedimentation. Wedge wire screens are also vulnerable to biofouling resulting in a decrease in water flow. The use of such passive screen systems cannot be used in all waters because of their large size and the disruption caused to the natural bank and riverbed. To reduce biofouling, wedge wire screens are made that continually leach copper. The introduction of such a toxic compound into the water body may be undesirable.

Methods involving filtration through sand and gravel can certainly be effective, but cannot be used in depositing environments such as lowland rivers. They cannot be viewed as a widely applicable technology.

EPA Response

EPA disagrees with the commenter. In the United States, the majority of applications using wedgewire screens are designed with mesh sizes greater than 2 mm. Unless they are designed with a screen size of less than 1 mm, wedgewire screens do not provide any controls for entrainment. EPA understands that there are limitations to the application of fine mesh wedgewire screens and that they may not be an appropriate or effective technology for every facility to meet the requirements of the new facility rule This rule was specifically written to allow site-specific determinations by the facility itself as to which design and construction technologies would be most appropriate based on the facilities knowledge of conditions at the facility and in the waterbody.

Wedgewire screens can be made of numerous different materials depending upon the site-specific conditions in the source waterbody. Wedgewire screens of copper may be used if conditions in the waterbody are such that biofouling occurs. EPA agrees that this material may not be appropriate for use where leaching occurs and species are present that would be adversely effected. However, the effect of materials should be considered when evaluating technologies to meet the requirements of today's rule.

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Subject Matter Code	17.0
Best Technology Available-Technologies	

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Organization Riverkeeper, et al.

An example of the planned application of mitigation technology

We are able to obtain some idea of the possible gains that can be made by the application of a suite of fish protection measures by looking at a specific example. At Sizewell on the east coast of the UK a new Pressurised Water Reactor Station has been recently built, based on an American design, alongside an existing station. Sizewell A has been a major catcher of fish over many years, reaching levels sufficient to cause blockages in the cooling water system and station shut-down. The main species impinged is the sprat (Sprattus sprattus), a small clupeid. This fish over winters close inshore especially in turbid waters. During the design phase of the B station several changes and improvements were made to the cooling water system to try and reduce the fish catch (Fleming, Seaby et al. 1994) including:

1. Adoption of a capped intake;
2. Adoption of a 50 cm/s designed approach velocity;
3. Location of the sub-littoral intake further offshore;
4. Elimination of intake superstructures;
5. Incorporation of a fish return system.

The intake was capped for two reasons, first to withdraw cooler deeper water and reduce the possibility of the formation of a surface vortex. Second, it allows fish to respond to horizontal rather than vertical flows. Fish species are ill equipped to deal with vertical flows and this has been shown to be particularly effective in reducing the impingement of pelagic species.

The adoption of a 50 cm/s design approach velocity has a doubtful benefit at Sizewell. The designed approach velocity only applies during slack water. Once the tide starts to flow, the intake water velocity will differ widely on the up and down tide sides of the intake.

The inshore waters around Sizewell are an important nursery ground for flatfish. Moving the intakes from 300m (the position of the A station intakes) to 600m offshore was an attempt to reduce flatfish impingement.

The superstructure of an intake acts as artificial reef. The construction of the intake without a superstructure was designed to reduce the attractiveness of the area to reef dwelling fish.

With all devices present and working the total fish catch at Sizewell B showed an approximately 50% decrease per m^3s^-1 over the number of fish caught at Sizewell A. For all species, other than sprat, the figures show a 35% decrease (Table 8).

Table 8 Mean daily catch per cumec of water abstracted at Sizewell A and B

	Sizewell A	Sizewell B	%Difference

All Fish Species	168.34	83.98	50.1
All Fish Species (exc. Sprat)	75.44	48.78	35.3

Sizewell B also had a fish return system to return as many as possible of the fish to the sea alive. Analysis of the survivorship of impinged fish indicated that it varied widely from species to species but tends to follow the basic pattern that pelagic species do not survive and the more bottom-living the species, the greater the survival. Species with no swim bladders (i.e. the flatfish) generally survived the fish return system. Species which had un-sealed swim bladders (physotomes) also survived well. Fish species with sealed swim bladders (physoclists) often, upon dissection, were found to have burst swim bladders. During impingement the fish would undergo depth changes, which would change the pressure rapidly from 3 to 1 atmospheres. The net result is that the fish return system while protecting some species did not greatly reduce the total number of individual fish killed by impingement.

In conclusion, at a coastal site with direct cooling the implementation of a full suite of state of the art fish protection features that were purpose built for the station were able to reduce annual fish impingement mortality by about 50%. However, this still results in many millions of animals being killed per year. A final important finding of this study was the importance of pressure changes within the intake system. To improve fish survival the EPA should consider defining the maximum pressure change to which fish are exposed. Pressure changes become much more important when sub-littoral intakes are used as the fish may be rapidly taken into a lower pressure regime. Such intakes can kill physoclist fish even before they are impinged on the screens.

EPA Response

EPA has evaluated all technologies that are available to minimize adverse impact. In the final rule, for facilities over 10 MGD, EPA is both requiring that facilities reduce impingement and entrainment to an equivalent level as that which can be achieved by a closed-cycle, recirculating cooling water system as well as requiring facilities to further reduce impact by limiting through-screen velocity, and requiring design and construction technologies when specific conditions exist in the waterbody. In addition, further controls are required to prevent facilities from taking a large proportion of the waterbody flow. For these facilities, EPA believes the combination of these requirements is best technology available. For facilities less than 10 MGD, EPA is requiring the facilities to limit through screen velocity, proportional flow and requiring them all to install design and construction technologies. EPA is not dictating the specific technologies with which a facility must meet these requirements. EPA believes that better controls can be implemented to minimize impingement and entrainment by letting the facility evaluate site specific conditions when choosing appropriate technologies.

EPA considered defining the maximum pressure change to which fish are exposed but decided not to make it a regulatory requirement in the rule because there are available technologies which can minimize impingement and entrainment and other adverse impacts without limiting this parameter.

Comment ID 316bNFR.206.125

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Organization Riverkeeper, et al.

Subject Matter Code 9.2
Types of Environmental Impacts Caused by CWIS

Effects at the ecosystem level

The main focus of the EPA proposals is to reduce the direct effects of cooling water intakes on fish impingement and entrainment. However, cooling water intakes affect many components within the local ecosystem and can potentially produce a wide range of impacts many of which are difficult to foresee. Some of these changes can lead to indirect effects on fish, crustaceans and top predators such as birds, as well as decomposers at the bottom end of the ecological hierarchy. Such changes are difficult to detect and document and have been little studied (A comprehensive review of knowledge up to 1983 is given in Langford (1983)). For many localities they have been hidden by other anthropogenic impacts because cooling water intakes have rarely been sited in pristine natural waters in which the local ecology has been studied prior to construction. Some of these indirect effects have been introduced above and will be brought together in this section from an ecosystem viewpoint. At the outset we need to be clear about how we can detect ecosystem level effects rather than changes in individual species populations.

While an individual organism can clearly be observed to respond to stress, it is by no means clear that such a concept can be applied to an ecosystem. It is clear that ecosystems can be damaged by human activities and even completely destroyed, but is it possible to detect changes that demonstrate that they are being placed under stress and ultimately suffering damage? Ulanowicz (1996) argues that ecosystem stress can be defined as an inhibition or reversal of the natural succession as characterised by Odum (1969). The main characteristics of this natural succession can be listed as:

1. Increasing species richness;
2. progressively greater trophic efficiency;
3. a richer structure for recycling materials;
4. more intense system activity;
5. greater trophic specialisation.

At the base of aquatic ecosystems there are the primary producers and the decomposer organisms. The primary producers can be divided between the large plants such as seaweeds and angiosperms which normally are fixed to the substrate and are limited to shallow waters and the terrestrial fringe and the planktonic, often single celled algae, protozoans and bacteria. The decomposers, which are particularly active in the substrate, comprise fungi and bacteria. Energy input into the system is derived from light and autochthonous material such as leaves and wood and human waste which is often terrestrial in origin. Both the primary producers and decomposers are used as food by a wide range of organisms. In the plankton, small crustaceans such as copepods are particularly important. A wide range of benthic worms, insects and filter feeders consume the decomposers. These primary consumers are fed on by small predators such fish, insects and larger crustaceans that are in turn the food for large fish, mammals and birds.

This general scheme is found in all shallow waters and is highly adaptable in that the relative size and

ecological activity of the different components can change dramatically between localities. In some areas, with large allochthonous inputs, the decomposers can dominate while in other waters the planktonic primary producers may be the dominate the base of the food web. The presence of a cooling water intake can influence the relative size and economy of the different components within an aquatic ecosystem. The general routes by which a cooling water system may stress the local ecosystem are as follows:

1. Differential mortality of different species resulting in changes in competitive ability.
2. The destruction of primary producers resulting in reduced production.
3.The destruction of planktonic primary consumers resulting in impoverished plankton.
4.Destruction of prey for juvenile fish, resulting in decreased food supply for various life stages of fish
5. The release of large numbers of dead planktonic organisms with the discharge water resulting in an enhanced energy input into the decomposer system.
6.Changes in the temperature, oxygen concentration and other physical variables that change the rate of ecological activity and relative competitive advantage between species.
7. The alteration of flow regimes and associated physical variables such as sediments that can result in a shift in species composition.
8. The creation of fixed structures that can act as reefs and change the species composition.
9. The introduction of large areas of hard surface on intake pipes, docks, cooling tower slats and other structures that can be colonised by organisms not normally abundant in the system.
10. The displacement of organisms, materials and nutrients from around the intake to the area of discharge resulting in the establishment of a non- equilibrium or unusual community in the discharge area.

This list is by no means complete, but it gives a feel for the wide range of channels via which a cooling water system impacts the local aquatic ecology. One means by which the impact of a power station can be appreciated is to visualise it as a giant, non-selective, filter feeder. It is rather like a whale that filters water and excretes to its environment and offers a habitat to a wide gut flora and a skin that is colonised by barnacles and other parasitic organisms. Fish and other predators can be attracted to the vicinity of the whale because it stirs up the water and sediments and places their prey in exposed positions where thy can easily be attacked. When it is argued that cooling water intakes are having no impact it is worth considering if it would seriously be suggested that a group of giant whales could be added to the same water body without appreciable impact.

However, this analogy may significantly understate the impact of cooling intakes. The whale moves and can seek out the richest feeding waters whereas cooling water intakes are static and thus tend to focus their impact on a restricted area. In tidal and flowing waters the movement of the water results in a large-scale impact on the plankton and active swimming community that is not dissimilar to what would be achieved by a mobile intake.

Many of the arguments claiming that power plants have negligible effects are based on the concept of surplus production. From an ecosystem perspective there can never be surplus production that can be removed from any component without impacting other parts of the system. It is self-evident that without the cooling water intake, other organisms would have consumed the production taken by the station (Boreman 2000).

EPA Response

EPA agrees that there are a variety of impacts associated with cooling water intake structures including impacts on individual organisms, reductions of threatened, endangered, or other protected species, damage to ecologically critical aquatic organisms, including important elements of the food chain, losses to populations including indigenous species, losses to commercial and recreational fisheries, and overall stress to aquatic ecosystem structure and function including changes in system structure and function.

EPA shares the commenters concern that removal of surplus production impacts some component of the ecosystem. Further, EPA does not believe that cooling water intakes have an inherent right to deplete the potential compensatory reserve (surplus production) of fish populations.

Because EPA's mission includes ensuring the sustainability of communities and ecosystems, EPA must comprehensively evaluate all potential threats to resources and work towards minimizing identified threats. See section VI.B.1-2 of the Preamble for additional information and discussion of the issues raised in this comment.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316b.NFR.529.301, 056.005, 068.050, and sections III and VI.B of the Preamble.

A recent and unusual example of the effect of a power plant at the ecosystem level is the study by Ulanowicz (1996) on creeks subject to discharges from a nuclear power station on the Crystal River, Florida. He noted that the greatest impact of the power station was on the highest trophic levels where the top predators, gulf flounder and stingray, either disappeared or changed their feeding pattern. There was clear evidence that the stressed system had reduced transfer efficiencies of energy from the lower to higher trophic levels. There was also a marked change in material recycling between stressed and natural creeks with faster recycling in the stressed system because material was retained at the lower trophic levels.

We know of no other studies that have attempted such a quantitative analysis of an ecosystem under stress from a power plant. However, there are considerable amounts of evidence indicating such aquatic ecosystem stress, typically reflected in a loss of top predators and a change in detrital and other low trophic levels concerned with recycling. The loss of top predators can be anticipated because of the efficiency of transference of production along food chains. This can be illustrated by a simple hypothetical example. A food chain in a pelagic system may comprise the following 4 components: 1. Primary producers -2. Planktonic crustaceans -3. Larval fish -4. Predatory fish. Such a system is impacted most heavily by a cooling water intake via entrainment losses on the first 3 trophic levels. Each of these levels is affected both by the direct loss of individuals and also in the case of levels 2 to 4 by the reduced availability of food. A feature of all such trophic chains is that only a small part of the production at each trophic level is passed to the next highest level and the result is relatively small flows to the top predators. For example, if a 10% transference efficiency is achieved, 1 g of carbon fixed by the primary producers would be transformed into 0.1, 0.01 and 0.001 g of carbon at the planktonic crustacean, larval fish and predatory fish levels respectively. If entrainment results in a reduction in standing crop sufficient to reduce transference efficiencies to 9% then the amount of production at the higher levels is reduced to 0.09, 0.0081 and 0.00073 g of carbon. Thus a 1% change in efficiency along the chain results in a 27% reduction of production at the predatory fish level. In general, at a large volume intake, stress on the ecosystem can be anticipated to produce just the types of impact noted by Ulanowicz (1996).

In reality, trophic structure is far more complex and species will be impacted to varying degrees. In general, longer-lived slower growing species will tend to be more heavily impacted. These species may be replaced by faster growing competitors. Such changes are characteristic of disturbed systems and generally result in reduced species richness and the efficiency of energy assimilation. While the outcome for particular species may be unpredictable, the essential feature remains: cooling water intakes entrain organisms over the full range of feeding behaviour from autrotroph to top predator. Because they kill organisms at many trophic levels their impact is similar to a general reduction in productivity and efficiency of energy transfer the effects of which will be far greater towards the top of the food web.

From this perspective we can take a radically altered view of some oft-repeated arguments. For example, it has long been argued that entrainment losses of predatory fish, such as striped bass, were

acceptable because density-dependent mortality was acting so that the fish would not have survived. If the effect of large-scale once through cooling is to reduce production and energy transference, then density-dependent mortality could be viewed as the end result of a food shortage and thus an indirect effect of entrainment at lower trophic levels.

The above discussion has focussed on energy flux along food chains. Planktonic plants, crustaceans and larval fish are particularly vulnerable to entrainment and can be killed to large numbers. Their loss results in an increased flux of resources to the decomposers (some of which is also derived from dead pieces of larger organisms broken-up by the cooling water system). The net result of reduced energy flux to the top predators and increased decomposer activity is an ecosystem dominated by simpler organisms. Notably, this promotion of decomposer forage at the expense of higher consumers is characteristic of the ecological stresses which in large part prompted the 1972 Clean Water Act amendments.

EPA Response

EPA agrees that there are a variety of impacts associated with cooling water intake structures including impacts on individual organisms, reductions of threatened, endangered, or other protected species, damage to ecologically critical aquatic organisms, including important elements of the food chain, losses to populations including indigenous species, losses to commercial and recreational fisheries, and overall stress to aquatic ecosystem structure and function including changes in system structure and function. Because EPA's mission includes ensuring the sustainability of communities and ecosystems, EPA must comprehensively evaluate all potential threats to resources and work towards minimizing identified threats. See section VI.B.1-2 of the Preamble and Response to Comment 316b.NFR.056.005 for additional information and discussion of the issues raised in this comment.

Comment ID 316bNFR.206.127

Subject Matter Code	9.2
Types of Environmental Impacts Caused by CWIS	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper, et al.

Other impacts

Evaporative cooling towers carry some potential for localised impact apart from their extraction of cooling water, because they may discharge bacterial slimes, fungi and a variety of organisms which colonise the tower but are not otherwise native to the local ecosystem. Such organisms can be suppressed by the use of biocides that may be discharged with the effluent. Evaporative towers also may concentrate nutrients such as phosphates and, when brackish or marine water is used, discharge salt spray drift. Nonetheless, the potential for localised impact from evaporative towers is relatively minor compared with the substantial improvement in entrainment and impingement over once through cooling, as well as the elimination of thermal impacts.

Aquatic impacts from dry cooled stations are negligible and few environmental problems have been reported. The only adverse impact we are aware of was fungal growth on dead insects in dry cooling tower filters resulting in the release of spores that produced lung irritation; a problem that can be controlled by good maintenance. It is clear that such unanticipated problems are rare and may be monitored and controlled when necessary.

EPA Response

It is EPA's view that the primary environmental impacts associated with cooling water intake structures are on the aquatic environment. EPA has, nevertheless, examined the non-water quality environmental impacts of the options it has selected and has found them to be acceptable. See 316bNFR.068.100 and 316bNFR.014.019 for additional discussion. Also, see section VI.B.2 of the Preamble for a more thorough discussion of non-aquatic environmental impacts associated with cooling towers.

Comment ID 316bNFR.206.128

Subject Matter Code	10.0
Best Technology Available	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper, et al.

The best technology available to minimise adverse environmental impact

It is impossible to remove any significant volume of water from a lake, reservoir, river or the ocean without also removing some of the organisms that are living within it. When water is extracted from healthy natural waters, to an over-riding degree the number of organisms killed be they fish, crustaceans or members of the plankton increases with the volume of water pumped. While much emphasis is placed in the EPA proposals on locality as a determinant of the number of fish killed, it is secondary to the volume of water pumped. Direct cooled power stations use such large volumes of water that there is no available suite of technologies that can be used to ensure that fish deaths and the impact on other aquatic life can be reduced to the levels that are achievable with the less consumptive forms of closed cycle cooling.

Examples such as the work at San Onofre and Sizewell Nuclear Generating Stations which are discussed in Section 2 support the contention that power plants using once through cooling will kill large numbers of fish by impingement even when considerable effort is expended on the siting of the intake and the installation of fish return technologies. This is principally because clupeids and other pelagic fish are easily damaged when they come into contact with surfaces. Further there is no demonstrated technology that can reduce entrainment at such sites. Moreover, at typical ocean sites antifouling procedures such as chlorination or heat treatment must be used which further pollute and damage the ecosystem. We conclude that once- through cooling is too damaging to inshore ocean ecosystems to be considered the best technology available.

In estuarine and inland waters entrainment is probably the greatest cause of death to aquatic organisms and ecosystem impact. Gunderboom technology has offered the prospect of enhanced protection to fish eggs and larvae at intakes, however, this technology must be viewed as untested and there are considerable doubts as to its applicability in many waters. While fine mesh screens can reduce impingement mortality they offer little reduction in entrainment of plankton. For lakes and rivers once-through cooling, even with sub-littoral intakes and fish protection devices, does not offer equivalent levels of environmental protection to that afforded by dry cooling. Given available alternatives, once-through cooling system in freshwaters are so consumptive as to eliminate serious consideration of them as the best technology available to minimize impact.

Technologies to reduce impingement and entrainment become more practical when closed-cycle cooling is used. The volume extracted by evaporative cooling-tower systems is much smaller than that of a direct-cooled station of similar size. Accordingly, the reduced water requirements can be met from more carefully screened and protected intakes. However, it is impossible to set an extraction volume or flow rate that will reduce the impact to negligible levels and studies have demonstrated that such systems will entrain juvenile fish (e.g. Aston and Fleming 1992). While appropriate technologies exist to almost eliminate the impingement of juvenile and adult fish, entrainment of plankton is almost impossible to stop. When deployed for short periods Gunderbooms are able to stop almost all fish entrainment, but their reliability and ability to work over long time periods and in a variety of waters is

untested and open to serious doubt. The introduction of large structures into a water body inevitably changes the local ecology and offers the potential to change the local community.

Evaporative cooling towers extract far less water than once-through cooling systems and thus certainly result in much lower impingement and entrainment mortality. If the aim is to ensure the minimisation of adverse impact on the environment then it is clear that the volume of water extracted from and returned to the natural environment should be minimised. There is a strong argument against the use of once-through cooling in power stations in all environments including oceanic waters. Where dry cooling systems are feasible from an engineering and economic viewpoint, then they must be the best available technology for the disposal of heat while minimising environmental impact.

EPA Response

See response to 316bNFR.206.017.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

R.W. Lawhn for Kerry Whelan

On Behalf Of:

Reliant Energy HL&P

Author ID Number:

316bNFR.207

Comment ID 316bNFR.207.001

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

Subject Matter Code OPP

General Statement of Opposition

We believe that the proposed regulations for cooling water intake structures (CWIS) will result in significant negative impacts for our future development activities without providing the benefit of additional environmental protection. Consequently, we offer these comments on the proposed regulations and issue our support and endorsement of the commits submitted by the Utility Water Act Group (UWAG) or behalf of the electric utility industry.

EPA Response

EPA disagrees with the contention that the final regulations will result in significant negative impacts on future development without providing additional environmental protection. Specific responses regarding future development are discussed in the preamble to the final rule, the Economic Analysis, and in separate responses to this commenter's specific comments.

Comment ID 316bNFR.207.002

Subject Matter Code 10.01

Regulatory Framework Options

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

EPA's proposed rule imposes new minimum technology requirements along with extensive pre-construction studies and monitoring on most generating facilities with new CWIS. The proposed regulations rely on an inflexible "one-size-fits-all" approach that is not consistent with the intent of Congress. This rigid approach is based on categories of waterbodies (rivers, lakes, estuaries, and oceans), general water body characteristics within the littoral zone (such as substrate type, bank slope, vegetation, and depth), and water-use volumes. While we agree that different types of waterbodies should be treated differently, we believe that EPA's categories are too broad to account for the myriad of differences that will be encountered during siting and construction of new facilities. Regulation based on these categories may not be appropriate for all facility locations and consequently may not result in substantial ecological benefit when compared to the significant cost entailed for compliance. In addition, this overly prescriptive approach will result in significant and unnecessary delays in permitting and construction of new facilities during a time when increased generation capacity is required.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.207.003

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

Subject Matter Code 10.14

Suggested Alternative: Site-specific Examination and Evaluation ("Tiered")

As endorsed by UWAG, we believe EPA should consider an alternative that would recognize certain CWIS technologies as avoiding appreciable risk of Adverse Environmental Impact (AEI). A facility that elected to employ those CWIS technologies would benefit from a streamlined permitting process. New facilities, where the use of such technology is not practicable from a cost or engineering perspective, could then have the option to perform site-specific studies to characterize the surrounding aquatic community. These studies could rely on existing data where appropriate or be augmented by new studies as necessary. Due to the high degree of variability among plan sites and their associated water bodies, we believe that the option for a site-specific approach would result in more effective protection for aquatic resources.

EPA Response

The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. See response to 316bNFR.008.001.

Comment ID 316bNFR.207.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

Regardless of the specific permitting route selected, we believe that the proposed regulation can not be implemented without a clear definition of Adverse Environmental Impact (AEI). The "single fish/single egg" approach to AEI is unreasonable, unrealistic, and ignores precedent previously established for the management of natural resources. AEI must be defined in terms of effects on the aquatic community, not individual members of that community. In implementing §316(b), EPA should recognize that fisheries resources are a renewable resource that can be managed for a sustainable yield. We believe that losses to fisheries due to CWIS are no more harmful than losses due to any other human activity and may not be harmful to fishery resources as a whole. Consequently, the proposed regulations should be consistent with resource management principals routinely employed by fisheries science and management. We encourage EPA to adopt the definition of AEI as proposed by UWAG.

EPA Response

Please see response to comment 316bNFR.069.008.

EPA's record demonstrates that cooling water intake structures do not impinge just one fish or one egg; that argument is specious. Instead, under today's rule EPA is minimizing impingement and entrainment as one form of AEI that occurs at cooling water intake structures.

Comment ID 316bNFR.207.005

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

As a general comment, we believe that Congressional intent through §3l6(b) was to regulate intake structures, not entire cooling systems.

EPA Response

EPA believes the final rule comports with Congressional intent.

Comment ID 316bNFR.207.006

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Additionally, when evaluating CWIS and the implementation of Best Technology Available (BTA), cost considerations were clearly intended for consideration. We note that the concept of BTA requires commercial availability of appropriate technology that can be employed in an economically practicable manner.

EPA Response

EPA agrees with this comment. Cost and economic practicability have been considered in the determination of BTA. For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. EPA determined economic practicability by using the most current data available in considering the cost of compliance as compared with the revenue of a facility, as well as the cost compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA, to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA.

Comment ID 316bNFR.207.007

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

Subject Matter Code 7.4

Water Withdrawal threshold

Finally, we believe that the intake flow limit of 2 MGD has been arbitrarily set without sufficient evidence to support that AEI will result in all cases. We believe that higher intake flow limits may be used in many circumstances without resulting in AEI.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

For further discussion of these points, see section VI.A.3 of the rule.

Comment ID 316bNFR.207.008

Author Name R.W. Lawhn for Kerry Whelan

Organization Reliant Energy HL&P

Subject Matter Code 13.1

Requirement of 0.5 fps

Likewise, we believe that the 0.5 ft/s flow velocity limit has been arbitrarily set and with no clear correlation to AEI. A host of other factors ranging from aquatic community composition to localized weather conditions are likely to have as much influence on entrainment and impingement as the 0.5 ft/s flow velocity.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Thomas R. Hill

On Behalf Of:

New England Fishery Management
Council

Author ID Number:

316bNFR.208

Comment ID 316bNFR.208.001

Author Name	Thomas R. Hill
Organization	New England Fishery Management Council

Subject Matter Code 10.01

Regulatory Framework Options

In order to minimize the potential adverse impacts on fish populations and their habitats, the Council supports EPA's decision to establish national standards with minimum requirements for location, flow, and velocity. This will remove the uncertainty inherent in the existing case-by-case, site-specific review, particularly for new facilities. Even when site-specific studies have been conducted, the National Oceanic and Atmospheric Administration has found that often not enough information exists to make a conclusive statement regarding potential impacts.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Comment ID 316bNFR.208.002

Author Name	Thomas R. Hill
Organization	New England Fishery Management Council

Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

If the final rule contains a provision for a rebuttable presumption accounting for site-specific characteristics and flexibility, then EPA should develop detailed guidance for designing, conducting, and reviewing rebuttable presumption arguments. Where the Council's managed species are potentially a concern, the Council and the National Marine Fisheries Service should be consulted when evaluating a rebuttable presumption demonstration.

EPA Response

Track II of the final rule and Section VII of the preamble to the final rule provide guidance regarding how Track II should be implemented. EPA may provide further guidance as appropriate. Track II includes a requirement that national, state or tribal fishery management agencies be consulted in specified circumstances. In addition, design and construction requirements under both Tracks I and II explicitly allow for input of fishery management agencies. See response to comment 316bNFR.009.004.

Comment ID 316bNFR.208.003

Author Name	Thomas R. Hill
Organization	New England Fishery Management Council

Subject Matter Code 9.4

Adverse Environmental Impact

The EPA should define adverse environmental impact within the final rule. EPA's suggested third alternative, which describes adverse environmental impact as impingement and entrainment, is the best alternative. Having a definition of adverse environmental impact is particularly important in light of the proposal to incorporate a framework for a rebuttable presumption within the final rule. EPA should avoid defining adverse environmental impact in an ecological context solely at the population or community level. Adverse environmental impact needs to account for forgone predation, the associated loss of secondary production, and localized impacts.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.208.004

Author Name	Thomas R. Hill
Organization	New England Fishery Management Council

Subject Matter Code 7.1

Definition: New Facility

The Council does not consider the definition of new facility in the proposed rule as appropriate to capture the range of facilities that could effectively implement the requirements of the new facility rule. The current definition would allow any modifications behind the intake pumps of an existing facility, including complete demolition and redevelopment of the facility, to be exempt from coverage under the new facility rule. This is of particular concern in the Northeast, where many existing facilities are being retrofitted or brought back into operation after years of non-use. The definition of "new facility" should attempt to capture any facility undergoing major redevelopment that could incorporate changes to existing cooling water intake structures that would reduce environmental impacts.

EPA Response

See response to 316bNFR.019.004.

Comment ID 316bNFR.208.005

Author Name	Thomas R. Hill
Organization	New England Fishery Management Council

Subject Matter Code 7.52

Request for Comment: Indirect Dischargers

The current regulations apply only to facilities which require a National Pollutant Discharge Elimination System (NPDES) permit. As EPA pointed out in the proposed rule, new facilities could structure their operations to place control of the cooling water intake structure with an entity that does not require an NPDES permit. In this scenario, the facility does not have to comply with any 316(b) requirements. By separating control/ownership of the cooling water intake structure from the permitted entity, there may be facilities the EPA does not propose to regulate that could cause adverse environmental impacts. Within the regulation, EPA should remedy this loophole and have water withdrawal controlled at the source of intake.

EPA Response

EPA has added language specific to that issue. See 40 CFR 125.81(b) and Response to Comment 316b.NFR.073.008.

Comment ID 316bNFR.208.006

Subject Matter Code	11.13
Littoral Zone in Tidal Rivers/Estuaries	

Author Name Thomas R. Hill

Organization New England Fishery Management Council

EPA is correct to require the application of best technology available, including minimization of impingement and entrainment of fish eggs and larvae, in all estuarine waters; The definition of estuary should be revised by striking the concept of an "unimpaired" connection with the ocean, and broadening the salinity range to include salinities greater than 30 parts per thousand.

EPA Response

EPA agrees with the commenter on the issue of broadening the definition of estuary to include salinities greater than 30 parts per thousand. The current definition was developed using guidance from other EPA programs and existing literature sources. Thus the relevant definitions for the rule are as follows :

Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

Tidal river means the most seaward reach of a river or stream where the salinity is typically less than or equal to 0.5 parts per thousand (by mass) at a time of annual low flow and whose surface elevation responds to the effects of coastal lunar tides.

However, after reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.208.007

Subject Matter Code	11.13
Littoral Zone in Tidal Rivers/Estuaries	

Author Name Thomas R. Hill

Organization New England Fishery Management Council

Cooling water intake structures should be located in the least biologically productive area. Identifying these areas by measuring a distance from the shore or littoral zone in not the best way to determine productive areas for oceanic waters. EPA should consider site-specific characteristics before allowing the siting of an intake pipe. Positioning an intake in an area where resources are concentrated could entrain or impinge a disproportionate percent of aquatic organisms while taking only a fraction of the authorized water volume. Cooling water intake structures should not be allowed if an impoundment structure (e.g. dam or weir) is necessary to operate an intake. This type of impoundment can create migratory barriers, alter sedimentation patterns, and increase the risk of thermal shock for fish passing into the impoundment.

EPA Response

EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. Under today's final rule, the Agency has adopted a different regulatory framework–a two-track approach–and does not set different requirements for best technology available for minimizing adverse environmental impact for different parts of tidal rivers and estuaries. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches. A case-by-case determination of location of the cooling water intake structure would be appropriate in Track I when determining the appropriate design and construction technologies to install for the requirements in Section 125.84(b)(4) and in Track II when determining technologies that meet the equivalent level of reduction in impingement and entrainment as Track I.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Richard B. Tabakin

On Behalf Of:

Cytec Industries, Inc.

Author ID Number:

316bNFR.209

Comment ID 316bNFR.209.001

Subject Matter Code SUP

General Statement of Support

Author Name Richard B. Tabakin

Organization Cytec Industries, Inc.

Overall, Cytec supports EPA' s intent of protecting, ecosystem organisms by requiring new facilities to utilize intake structures that utilize state-of-the-art design. We are, nevertheless, concerned with certain underlying assumptions and details included in the proposed standards:

EPA Response

EPA appreciates your concerns regarding certain underlying assumptions and details included in the proposed standards. The Agency has addressed all specific concerns raised about underlying assumptions and other details included in the proposed regulation in this Comment/Response Document .

Comment ID 316bNFR.209.002

Author Name Richard B. Tabakin

Organization Cytec Industries, Inc.

Subject Matter Code 7.42

Request for Comment: Higher Threshold for Smaller Withdrawal Percentages

The proposed 2 MGD threshold is unnecessarily low for many surface water bodies, Cytec believed that a more appropriate approach would be to consider the intake structure flow relative to the flow or the surface water. Using this approach, the threshold for the proposed regulation might be, for example, one (1) percent of the surface water flow. Below this threshold, the regulation would not apply. If appropriate, the 24-hour/25 year low flow could be used as the benchmark.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

No percentage flow threshold has been added to the applicability provisions. Rather, the rule includes proportional flow requirements that have been demonstrated to be achievable at new facilities. Using a percentage flow threshold in the applicability section of the rule would, unless the percentage is extremely low, allow large withdrawals on large water bodies with no applicable national standards, which EPA does not view as necessary consistent with the requirements and goals of section 316(b).

Comment ID 316bNFR.209.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Richard B. Tabakin

Organization Cytec Industries, Inc.

This standard was specifically written to address new cooling water intake structures. Cytec recommends that it also apply to new potable water, agricultural waters and other type intakes as well.

EPA Response

Section 316(b) of the CWA provides that any standard established pursuant to section 301 or 306 of the CWA and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact. This final rule applies to new greenfield and stand alone facilities that use cooling water intake structures to withdraw water from waters of the U.S. and that have or require a National Pollutant Discharge Elimination System (NPDES) permit issued under section 402 of the CWA. The Clean Water Act section 316(b) clearly limits EPA's authority to regulate intake water to cooling water intakes. Potable water, agricultural waters and other such type intakes do not withdraw water for cooling water purposes.

Comment ID 316bNFR.209.004

Subject Matter Code EXIST

Existing Facility Rule

Author Name Richard B. Tabakin

Organization Cytec Industries, Inc.

Cytec recognizes that retrofit of existing intake structures, for example larger than 25 MGD, could have beneficial effect on ecosystem, but encourages EP A to carefully evaluate the cost and difficulties associated with achieving this.

EPA Response

This rule applies to new facilities that use cooling water intake structures. Existing facilities will be addressed under Phase II and III regulations.

Comment ID 316bNFR.209.005

Author Name Richard B. Tabakin

Organization Cytec Industries, Inc.

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA's discussion of dry cooling systems as an available option to cooling water systems should be limited to condensing vapors. Dry cooling systems are not technically feasible when process fluids must be cooled to temperatures approaching ambient temperature.

EPA Response

EPA agrees with the commenter that dry cooling systems are not technically for all manufacturing application. See Section V.C-4 of the preamble to the final rule and response to comment 316bNFR.003.002.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Michael Levitt

On Behalf Of:

National Oceanic and Atmospheric
Administration (NOAA)

Author ID Number:

316bNFR.210

Comment ID 316bNFR.210.001

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

NOAA supports the efforts of EPA to reduce the adverse environmental impact associated with the operation of cooling water intake structures. EPA's proposal to adopt national minimum standards that allow for additional controls by state permitting authorities will provide protection not available in the current case-by-case approach to permitting cooling water intake structures.

NOAA commends EPA for recognizing the important differences between water body types and establishing a process to provide the greatest protection in areas of greatest biological productivity.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA is setting the same performance-based technology requirements for all waterbodies as for tidal rivers and estuaries (the most stringent requirements from the proposed rule) under Track I of the final rule. Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. Under Track II there are design intake flow requirements that are based on waterbody categories (see Section 125.84).

Comment ID 316bNFR.210.002

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 2.2

Obligation Under 316(b)

NOAA concurs that EPA should address new and existing facilities under separate rules. EPA's objectives for new and existing facilities should be consistent between both rules and support the intent of section 316(b), which should be to require the best technology available (BTA) to minimize the adverse environmental impacts associated with cooling water intake structures.

EPA Response

EPA agrees with the comment that the rules for new and existing facilities should be addressed separately.

Comment ID 316bNFR.210.003

Subject Matter Code	10.01
	Regulatory Framework Options

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

NOAA supports EPA's decision to establish national standards with minimum requirements for location, flow, and velocity to remove the uncertainty inherent in the existing case-by-case, site-specific review, particularly for new facilities. Even when site-specific studies have been conducted. NOAA has determined that often not enough information exists to make a conclusive statement regarding potential impacts. According to EPA's cost estimates, adopting EPA's proposed BTA will not result in significant economic impacts. The ability or new facilities to incorporate BTA design and siting characteristics into the planning without adding substantial costs is the primary advantage of a new facility rule.

EPA Response

EPA agrees that new facilities have the flexibility to take advantage of and incorporate the best available technology and science available to minimize environmental impacts. EPA also agrees that impingement and entrainment is appropriate as an endpoint for new facilities because of the uncertainty inherent in the existing case-by-case, site-specific review, particularly for new facilities (even when site-specific studies have been conducted). See response to comment 316bNFR.210.001.

Comment ID 316bNFR.210.004

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

If a rebuttable presumption argument is adopted as a component of the final rule, EPA should develop detailed guidance for designing, conducting, and reviewing rebuttable presumption arguments. If allowed as part of the permitting process for new facilities, the rebuttable presumption demonstration should be the full responsibility of the facility requesting the alternative requirements. Additionally, the standard for review should be such that the demonstration clearly and convincingly ascertains that adverse environmental impacts will be minimized. Where NOAA's trust resources are potentially a concern, NOAA should be consulted when developing/evaluating a rebuttable presumption demonstration.

EPA Response

See response to 316bNFR.009.004 and 316bNFR.208.002.

Comment ID 316bNFR.210.005

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 7.1

Definition: New Facility

What is a "New Facility"?

NOAA is concerned that EPA 's definition of "new facility" does not appropriately capture the range of facilities that could effectively adopt the requirements of the new facility rule without extensive or costly retrofits. EPA's proposed definition of "new facility" would allow any modifications behind the intake pumps of an existing facility, including complete demolition and redevelopment of the facility, to be exempt from coverage under the new facility rule. NOAA is particularly concerned with the implications of EPA 's definition of new facilities for resources in the Northeast, where many existing facilities are being retrofitted or brought back into operation after years of being out-of-service. The definition of "new facility" should attempt to capture any facility undergoing major redevelopment that could incorporate cost-effective changes to existing cooling water intake structures that would reduce environmental impacts.

EPA Response

See response to 316bNFR.019.004.

Comment ID 316bNFR.210.006

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

What is a Cooling Water Intake Structure?

NOAA supports EPA's proposal to define cooling water intake structures as the total physical structure and any associated constructed waterways used to withdraw water provided that 25 percent of the water is used for cooling. Continued use of the definition of cooling water intake structures found in EPA's 1977 draft guidance and 1976 final rule would not reflect the current understanding of the impacts to aquatic resources associated with cooling water intakes

EPA Response

EPA agrees with the comment. In addition, EPA has placed the twenty-five (25) percent threshold in the applicability section of the final rule. Cooling water intake structures below this threshold are not subject to the final rule; however, permit writers should determine any appropriate section 316(b) requirements for structures withdrawing less than 25 percent of intake flows for cooling purposes on a case-by-case basis.

Comment ID 316bNFR.210.007

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 7.3

Definition: Waters of the US

EPA's proposal to include new facilities that withdraw water from cooling ponds that are considered waters of the United States is appropriate. Cooling ponds classified as waters of the United States can support diverse aquatic communities, and exchanges (e.g., tidal) between cooling ponds and natural systems can be important to maintaining acceptable water quality standards and biological productivity of both water bodies.

EPA Response

No response necessary.

Comment ID 316bNFR.210.008

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 7.5

Applicability to Facilities Subject to NPDES Permit

EPA has invited comment on several specific scenarios related to new facilities and the requirement that a facility must have or require an NPDES permit to be subject to the section 316(b) regulations. EPA has pointed out that new facilities may restructure their operations and place control or the cooling water intake structure with an entity that does not require an NPDES permit. If this is done, a facility effectively does not have to comply with any 316(b) requirements. EPA recognizes that by separating control/ownership of the cooling water intake structure from the permitted entity there may be new facilities the EPA does not propose to regulate, but that may cause adverse environmental impacts. EPA should seek a remedy, within the regulation, to close this loophole and have water withdrawal controlled at the source of intake. The owner of the intake structure should have ultimate responsibility for complying with the section 316{b) regulations

EPA Response

Section 125.81(b) of today's rule provides that a new facility is subject to today's rule if it obtains cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States. That section states explicitly that this provision is intended to prevent circumvention of the rule by creating arrangements to receive cooling water from an entity that is not itself a point source.

Comment ID 316bNFR.210.009

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

What Constitutes Adverse Environmental Impact?

EPA should define adverse environmental impact within the rule, EPA's suggested third alternative, which describes adverse environmental impact as impingement and entrainment, is the best alternative. Having a definition of adverse environmental impact is particularly important in light of the proposal to incorporate "framework for a rebuttable presumption within the final rule. If the rebuttable presumption argument is allowed, EPA needs a definition of adverse environmental impact to establish a standard for which to review the rebuttab1e presumption. Similarly, EPA's description of site-specific alternatives for addressing section 316(b) permit requests all refer to analyses to predict (or minimize) the potential for adverse environmental impact. It is unclear how EPA could implement these alternative approaches in a consistent manner that is protective of aquatic resources without defining the acceptable endpoint (i.e., defining adverse environmental impact).

EPA's minimum level of protection against impingement and entrainment should be analogous to the protections sought in EPA’s other water quality based regulatory programs, which seek the protection and propagation of fish and minimization of site-specific adverse environmental impacts. Although cooling water intake structures can cause adverse environmental impacts by reducing in-stream flow, and through the subsequent elevation of water temperature from the thermal discharge, the focus of the rule should be to find the national standard (or BTA) to minimize impingement and entrainment (which are the most direct and preventable adverse impacts). Therefore, an acceptable definition or level of adverse environmental impact should not be established without thorough consideration or the methods and technology for avoiding or minimizing impacts, as stipulated by section 316(b) of the CWA.

EPA should avoid defining adverse environmental impact solely at the population or community level. Adverse environmental impact needs to account for predation forgone, the associated loss of secondary production, and localized impacts. Allowing a reduction in fisheries populations based on the idea that populations exhibit surplus production, and will compensate for losses, ignores the fact that surplus production serves to maintain population levels exposed to multiple stressors (e.g.. climatic weather events, natural fish kills, and fishing mortality). Although many stressors are cyclic or can be regulated based on population size (e.g.. fishing mortality), power plant induced mortality typically cannot be adjusted based on fluctuations in population size.

In several places EPA refers to biocriteria as a potential tool to define adverse environmental impact or assess the risk of adverse environmental impacts. NOAA is concerned that EPA has not identified how it proposes to use the information obtained during a bioassessment to determine risk associated with operating cooling water intake structures. Although NOAA recognizes the recent advancements in developing multimetric tools for assessing aquatic ecosystem health, multimetric bioindices are not designed as tools to predict site-specific impacts. Furthermore, guidelines for conducting bioassessments are not well established and biocriteria do not exist for most waters, particularly

estuaries and oceans. The focus of a new facility rule should be to apply BTA to minimize adverse environmental impacts, rather than to permit activities based on the ecological health of a water body.

EPA Response

Please see responses to comments 316bNFR.507.004 and 316bNFR.529.005.

EPA agrees with the commenter that surplus production maintains population levels exposed to multiple stressors.

EPA also agrees that biocriteria guidance is limited for several waterbody types and has rejected this approach to assessing AEI for the purposes of today's rule for new facilities.

Finally, EPA agrees that site-specific approaches are less susceptible to being implemented in a consistent manner.

Comment ID 316bNFR.210.010

Subject Matter Code 125.83.9

Definition: Estuary

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

EPA's definition of an estuary is not completely accurate. Estuarine salinity can exceed 30 parts per thousand, therefore, EPA's reference to the upper limit of estuarine salinity (i.e., less than 30 part per thousand) should be deleted. Also, the term "unimpaired" should be removed from EPA's description of an estuary. An estuary is better defined as a semienclosed coastal body of water having natural connection to the open sea and within which saltwater is mixed with fresh water derived from land. An estuary could include all or part of the mouth of a river or stream and includes coastal bays, sounds, and lagoons. The classification of water body types should correlate salinity with the predominant flora and fauna.

EPA Response

EPA agrees with the commenter that, in certain limited situations, estuarine salinity can exceed 30 parts per thousand, therefore, in today's rule, the definition of an estuary is as follows :
Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Comment ID 316bNFR.210.011

Subject Matter Code 125.83.19

Definition: Ocean

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

EPA should clarify the language used to define oceans, by stating that "The Agency is not using the definition of oceans found at CWA 502(10) because that definition is limited to high seas beyond the contiguous zone (i.e., beyond 12 nautical miles)...EPA's definition of oceans for the purposes of implementing section 316(b) includes nearshore coastal waters and offshore areas."

EPA Response

EPA disagrees with the commenter that the definition is arbitrary. This definition was developed using guidance from other EPA programs and existing literature sources. The relevant definitions for the rule are as follows :

Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

Tidal river means the most seaward reach of a river or stream where the salinity is typically less than or equal to 0.5 parts per thousand (by mass) at a time of annual low flow and whose surface elevation responds to the effects of coastal lunar tides.

However, after reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.210.012

Subject Matter Code 125.83.14

Definition: Littoral Zone

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

EPA should clarify its definition of "littoral zone", particularly within estuaries and oceans. Littoral zone typically refers to the intertidal zone, and redefining littoral zone as; the "euphotic" areas of the "neritic waters" is confusing rather than clarifying. Prescribing BTA to the euphotic areas (which is appropriately defined as the ocean waters that receive enough light to support photosynthesis - approximately 1% of incidental light) of the neritic zone is extremely broad. For example, in temperate and tropical areas the euphotic zone could extend to depths beyond 100 meters. In many ocean waters, particularly along the eastern sea board, the euphotic zone would extend the entire 1ength of the continental shelf. Additionally, EPA's definition is confusing in that littoral zone is defined to include “the deepest point at which submerged aquatic vegetation can be sustained (i.e., the photic zone extending from shore to the substrate receiving one (1) percent of incident light”. However, submerged aquatic; vegetation typically requires 15 to 20% of incident light and may not be supported through the full range of the photic zone. Similarly, the photic zone may not extend to a depth that includes the substrate, Because EPA's proposed rule requires BTA anywhere within an estuary, a definition of littoral zone for these water body types is irrelevant. In the absence of a well documented rebuttable presumption, EPA should require the BTA In all estuarine and nearshore ocean waters.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define the best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.210.013

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

NOAA recognizes that EPA's discussion (p. 49081) of the reduction of number of fish killed by converting to dry cooling towers is provided for reference only. However, EPA should provide direction in the final rule that ensures that if BTA (or permit limits) is to be based on fish killed, the focus should be on the mortality rate rather than number of fish. Linking BTA or permit limits to mortality rates protects against fluctuations in population levels and prevents a situation where mortality rates increase when population is decreasing.

EPA Response

Because fish stocks can exhibit high inter-annual variability, EPA agrees that it is critical to avoid high mortality rates when a stock is experiencing declines due to other factors such as extreme weather events or increased fishing pressure. Today's rule does not seek to establish a set number of individuals that can be impinged or entrained annually for the duration of the rule. The focus of today's rule is to minimize entrainment and impingement losses for all species and which requires the involvement of federal and state resource management agencies to avoid substantial impacts to fisheries.

Comment ID 316bNFR.210.014

Subject Matter Code	11.2
Request for Comment: Considerations for Impacts Outside Littoral Zone	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

The proposed rule considers two alternative approaches to applying the most stringent requirements: one based on a fixed distance from the shoreline and the other based on a fixed distance from the littoral zone. Because some littoral zones extend far from shore, a fixed distance from shore would not be protective in many circumstances and is not based on avoiding areas of greatest biological productivity. NOAA prefers that EPA require cooling water intake structures to be placed in the least biologically productive areas (whether in or out of the littoral zone) where the likelihood of impingement and entrainment of aquatic organisms is lowest.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.210.015

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 12.0

Best Technology Available-Flow and Volume

NOAA agrees that impacts from entrainment relate directly to the capacity or intake flow. EPA's proposed limits may be conservative for water bodies with few diversions, however, it may not allow sufficient now for all species and their life stages where flow has been already allocated for other uses. EPA should ensure that instream flow is sufficient for the propagation of living marine resources and their various life stages. The cumulative impacts of multiple diversions from freshwater rivers or streams needs to be considered.

EPA Response

EPA believes today's final rule for new facilities minimizes adverse environmental impact in a manner that accounts for cumulative impacts. However, if a state permitting authority wishes to be more stringent, the rule, pursuant to Section 510 of the Clean Water Act provides that additional requirements may be placed in the NPDES permit.

Comment ID 316bNFR.210.016

Subject Matter Code	12.0
Best Technology Available-Flow and Volume	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

Basing regulations on flow (or tidal excursion) requires sufficient hydrological data. NOAA is concerned that this data has not been sufficiently collected in many areas and would like the final rule to provide guidance on identifying acceptable hydrological data to determine flow rates. The lack of hydrological data is a particular concern in Alaska, where flow data has not been collected on most rivers and streams. As such, NOAA recommends that at a minimum five years of continuous pre-project stream now and climatological data be used to detem1ine basic hydrological parameters for cooling water intake structures covered under this proposed rule in Alaskan waters when data is lacking.

EPA Response

EPA expects that most new facilities will be sited at locations with sufficient hydrological data to establish a design intake limitation.

For riverine facilities, EPA estimated the number of available river miles available to support average facilities within the utility, nonutility and manufacturing sectors. For each sector, an average design intake flow was derived from facilities in the 67th percentile and higher and weighed against data collected from EPA's BASINS program. Segments deemed "available" are able to support the representative facility. That is, siting a facility of a particular size at that location would not withdraw more than 5% of the mean annual flow of a particular waterbody.

The analysis performed using BASINS data is not intended to be prescriptive as to where new facilities may locate, but rather an indication of the dispersal of available river miles. A facility with a design intake capacity lower than those used for this analysis may have a greater range of river miles available for its use.

EPA acknowledges data instream flow data may not be available for every freshwater river or stream in the United States. The US Geological Survey currently maintains data collected from thousands of gauging stations located in the 50 States, the District of Columbia, Puerto Rico and US Virgin Islands. While this data does cover the vast majority of stream segments in the United States, some segments in remote or undeveloped areas may not be represented. This situation is largely particular to inland regions of Alaska, where historical data often does not stretch back the 10 years recommended in Today's Rule, if any exists at all. In those situations, EPA encourages the facility to investigate other potential sources of instream flow information which may not be nationally available (state agencies, universities, other local businesses). When no instream flow data is available, my use his/her discretion to establish an acceptable alternative.

Under ideal conditions, 10 years of instream flow data would be used to accurately calculate the mean annual flow of the source water body. EPA believes this amount of data is sufficient to account for

any non-seasonal climatological variations which may result in extremely low or extremely high stream volumes.

EPA believes that sufficient data is available for facilities which choose to locate on an estuary or tidal river. EPA recently completed an analysis of existing estuarine facilities using the tidal excursion method described in the proposal (65 FR 49098) and found data available for 95% of the facilities reviewed. In some cases, data were unavailable due to a lack of information about the location of the facility.

NOAA publishes annual information regarding tidal currents for the Atlantic, Pacific, and Gulf coasts of the US, as well as nautical charts for all coastal states and territories. Thus, the basic information needed to calculate the tidal excursion is available for all potential facilities sited in the United States and its territories.

Comment ID 316bNFR.210.017

Subject Matter Code 12.12

25% 7Q10

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

Basing water withdrawal rates on the annual mean flow could lead to unintended adverse environmental impacts, since many organisms susceptible to impingement and entrainment are present during the lowest flow periods (i.e., summer). EPA has appropriately identified the importance of considering low flow periods in its use of the 7Q10; however. EPA does not explain how allowing for greater percentage of water withdrawal during periods of lowest flow (and greater species density arid elevated stress) is as protective as allowing less water withdrawal during periods of high flow. NOAA recommends that EPA reevaluate the numbers selected for flow and volume against EPA's standard for protecting 99 percent of the aquatic community from impingement and entrainment. NOAA recommends that EPA provide guidance to the Directors to consider that any number presented by EPA in a final rule may need to be reevaluated in site-specific circumstances, particularly for systems with highly variable flows. Also, site-specific considerations will need to be addressed for endangered or threatened species.

EPA Response

Today’s rule establishes technology-based performance requirement, based on a two-track approach that reflects the best technology for minimizing impingement and entrainment impacts of a cooling water intake structure. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in the same minimization of impingement and entrainment impacts as would be achieved under Track I.

Comment ID 316bNFR.210.018

Subject Matter Code	12.31
Request for Comment: Proportional Flow Requirement	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

Although the concept of limiting total intake to 1% of tidal excursion volume as defined in the proposed rule seems reasonable. EPA should still consider site-specific characteristics before allowing the siting of an intake pipe. Positioning an intake in an area where resources are concentrated could entrain/impinge a disproportionate percent of aquatic organisms while taking only a fraction of the authorized water volume.

EPA Response

Instead of varying requirements based on waterbody type EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

Comment ID 316bNFR.210.019

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

On page 49078 the discussion includes the sentence, "Therefore, these areas [estuaries and tidal rivers] require the most stringent minimum controls including measure in addition to flow and velocity requirements." The construction of the underlined phrase is awkward and potentially contradicts EPA's intent. The word “minimum” should be deleted.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Therefore, the referenced sentence has been removed from the final rule.

Comment ID 316bNFR.210.020

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 14.1

Minimization of Impingement/Entrainment at Littoral

Additional Design and Construction Technologies.

EPA is proposing that facilities whose cooling water intake structures are located in the littoral zone implement additional design and construction technologies that minimize impingement and entrainment of fish, eggs, and larvae and maximize survival of impinged adult and juvenile fish. NOAA recommends the use of positive-exclusion barrier screens, as an appropriate technology for the protection of downstream migrant salmon. EPA should develop a procedural approach to allow evaluation and installation of experimental behavioral guidance devices. Information on this process can be found on the National Marine Fisheries Service (NMFS) Northwest Region's web site at http://www.nwr.noaa.gov/1hydrop/exp_tech1.htm.

EPA Response

EPA has identified exclusion barrier screens as one type of design and construction technology that can be used in compliance with the final rule. However, under the rule, where specified conditions exist, the permit applicant must select and implement design and construction technologies that are most effective in minimizing impingement mortality and entrainment of all life stages of fish and shellfish. EPA may specifically address the use of experimental behavioral devices in future guidance on this rule.

Comment ID 316bNFR.210.021

Subject Matter Code	15.13
Discretionary/Voluntary Approaches	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

Restoration

The proposed rule states that the EPA believes there are "limits on the ability of direct control technologies (location, flow, velocity, and other requirements) to eliminate environmental harm in all circumstances" from cooling water intake structures. Therefore, pursuant to section 316(b) determinations, the EPA envisions using restoration measures, such as wetland restoration/creation, fish hatcheries or fish stocking programs, removing impediments to fish migration, etc., as mitigation fur adverse effects to aquatic organisms or habitat.

NOAA would strongly object to any proposal that provides facilities "the option of volunteering to perform restoration measures and having those measures taken into account in evaluating the risk of adverse environmental impact." Similarly, restoration measures should not be allowed in lieu of or as a supplement to BTA.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II. Given that such measures will be authorized only if they result in comparable performance. EPA believes their application is consistent with the CWA section 316(b).

Comment ID 316bNFR.210.022

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 16.2

Request for Comment: Establishing Alternative Requirements

EPA appropriately furthers the statutory objective of section 316(b) by seeking the most stringent controls within the areas of greatest production of aquatic organisms. Although the areas with the greatest abundance of organisms susceptible to impingement and entrainment may often be within the littoral zone, the final rule should be structured to accommodate the instances when species (e.g., shortnose sturgeon, American Shad, and striped bass) that rely on areas outside the littoral zone are adequately protected.

EPA Response

See response to comment 316bNFR.508.017 and the preamble to the final rule for an explanation of why EPA is not using the littoral zone concept in the final new facility rule. The requirements in the rule appropriately reflect the statutory standard for all waterbodies in all locations.

Comment ID 316bNFR.210.023

Subject Matter Code	16.1
Discretionary Options Available to the Director	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

Cooling water intake structures not covered by the proposed new facility threshold or 2 MGD could produce adverse impacts, particularly those facilities that withdraw water from systems with highly variable or low flows. EPA should provide guidance to the Directors for how to address potential impacts from facilities that would not fall within the scope of the new facility rule. This guidance should parallel the same screening process used for facilities covered under this rule and include an assessment of aquatic organisms subject to impingement and entrainment, water body type, and acceptable diversion rates. Likewise, guidance should be established for circumstances when even with BTA in place, impacts may occur. Therefore, NOAA supports EPA's suggested approach of requiring the Directors to consider where individual facilities might have site-specific characteristics that make one or more or the national BTA requirements insufficient to minimize adverse environmental impact.

EPA Response

Today's new facility requirements would not apply to a new facility that has or requires an NPDES permit but does not meet the two MGD intake flow threshold or the twenty-five percent cooling water use threshold. However, such a facility would be subject to permit conditions implementing section 316(b) of the CWA set by the permit director on a case-by-case basis, using best professional judgment.

Comment ID 316bNFR.210.024

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code MISC

Miscellaneous Comment

Essential Fish Habitat.

The 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) included provisions to identify and conserve essential fish habitat (EFH) based on Congressional concern that one of the greatest threats to commercial and recreational fisheries is the loss of marine, estuarine, and other aquatic habitats. The MSFCMA defines EFH as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The MSFCMA required the identification of EFH for all Federally managed marine fish species, including the various life stages of each managed species. A subset of EFH, known as Habitat Areas of Particular Concern (HAPCs), can also be designated based on vulnerability or particularly important ecological function of specific areas. The MSFCMA also requires Federal agencies to consult with NMFS on any action that may adversely affect EFH.

Areas designated as EFH include estuarine, coastal, and pelagic waters and substrates. Similarly, EFH can be designated in fresh water river systems that support anadromous species of Federally managed fish (e.g. , salmon). The sustainability of EFH for Federally managed species should be considered in Section 316(b) permitting decisions, and many individual 316(b) permits issued by EPA will require EFH consultation. Guidance in EPA's final rule should refer permit writers and Directors to NMFS staff for reference to areas designated as EFH and HAPCs to evaluate how permitting decisions might affect EFH.

EPA Response

EPA fully considered the 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and in particular the conserve essential fish habitat (EFH) and Habitat Areas of Particular Concern (HAPCs). If EPA had maintained the proposed rule framework which nationally defined littoral zone in sensitive areas, then using EFH and HAPCs to help evaluate permitting decisions may have been considered. However, the final rule was revised to establish a technology-based performance rule that does not nationally define littoral zones for sensitive areas. The final rule establishes technology-based performance requirements based on the best technology available for minimizing adverse environmental impact associated with the use of these structures. The requirements of the rule are expected to decrease the expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. The requirements effectively reduce impingement mortality and entrainment to the greatest extent possible that is economically practicable.

In addition, the national cooling water intake structure requirements would be implemented through permits issued under the NPDES program (CWA section 402). EPA’s NPDES permitting regulations

at 40 CFR 122.49 contain a list of Federal laws that might apply to federally issued NPDES permits. The provisions of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 et seq., relating to essential fish habitat might be relevant. Nothing in this final rulemaking authorizes activities that are not in compliance with these or other applicable Federal laws.

Comment ID 316bNFR.210.025

Subject Matter Code	MISC
	Miscellaneous Comment

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

Endangered Species Act

EPA's proposed regulations may affect species listed as threatened or endangered or habitat designated as critical pursuant to section 4 of the ESA of 1973, as amended (ESA; 16 U.S.C. § 1533). Therefore, your office should initiate consultation pursuant to section 7 of the ESA with NMFS' Office of Protected Resources before you take final action on these regulations.

EPA Response

EPA does not believe that consultation on this rule is necessary. The regulation does not authorize any activity that may have an effect on listed species. Rather, it sets minimum, technology-based standards for the location, design, construction and capacity of intake structures that must be met in NPDES permits issued to facilities that withdraw water for cooling purposes. Whether a particular facility may have an effect on listed species and, if so, the nature of such effects, will depend on site-specific circumstances that will be considered in the NPDES permitting process. This rule, therefore, solely provides a context in which the permit-issuing authority will exercise substantial discretion in determining what permit conditions are needed to ensure that adverse environmental impacts (including any adverse effects to listed species) are minimized using the best technology available.

Moreover, prior to the commencement of a specific activity that may have an effect on species, EPA would, in the case of a federally issued NPDES permit, consult with the Fish and Wildlife Service and/or National Marine Fisheries Services under section 7 of the ESA to ensure that the permit was not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. See 40 C.F.R. 122.49(c). In the case of NPDES permits issued by States or Tribes, EPA would exercise its broad permit oversight authority under section 402(d) of the CWA to ensure the protection of endangered and threatened species. See Memorandum of Agreement Between the Environmental Protection Agency, Fish and Wildlife Service and National Marine Fisheries Services Regarding Enhanced Coordination under the Clean Water Act and Endangered Species Act, 66 Fed. Reg. 11202 (Feb. 22, 2001). Nothing in this rule authorizes any take of listed species in violation of section 9 of the ESA or any activity that is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat.

Comment ID 316bNFR.210.026

Author Name	Michael Levitt
Organization	National Oceanic and Atmospheric Administration (NOAA)

Subject Matter Code 15.13

Discretionary/Voluntary Approaches

Federal agencies cannot use mitigation to avoid a jeopardy determination under the Endangered Species Act.

EPA Response

See preamble sections V.B.2.f and VI.L of today's final rule for discussions on restoration measures in Track II. EPA notes that this rule is issued under the CWA, thus the role of mitigation under the ESA does not govern this rule. Further, the ESA will continue to apply in addition to any CWA requirements and the ESA will apply in the permitting context.

Comment ID 316bNFR.210.027

Subject Matter Code	15.11
Mandatory Approaches	

Author Name Michael Levitt

Organization National Oceanic and Atmospheric Administration (NOAA)

EPA should only allow restoration (i.e., compensatory mitigation) after exhausting all practicable measures to avoid and minimize adverse impacts.

There are likely few circumstances where a combination of proper siting, now and velocity restrictions, and fish screening cannot be used to minimize adverse environmental impacts. New facilities can site and design operations in the most environmentally responsible manner and EPA should not allow mitigation to be used as an option for determining BTA to minimize adverse environmental impact. When required, mitigation should be completed before project construction and be in-kind. Any mitigation or restoration, including in-lieu fee agreements should be completed in consultation with other state and Federal resource agencies.

NMFS is particularly concerned that mitigation requirements will differ greatly among states (i.e., permitting authorities), thus weakening the protections sought through the national rule making. Permits for new facilities should be denied if they can not be sited and designed to protect fish and habitat resources. Restoration may be more appropriately applied to offset impacts from existing cooling water intake facilities under EPA‘s existing facility rule.

EPA Response

See preamble sections V.B.2.f and VI.L of today's rule for discussions on restoration measures in Track II. See 316bNFR.210.021.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Unsigned

On Behalf Of:

Electric Power Research Institute (EPRI)

Author ID Number:

316bNFR.211

Note

No comments submitted--only supporting documents, which may be found in the docket.

Comment ID 316bNFR.211.001

Author Name Unsigned

Organization Electric Power Research Institute (EPRI)

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

No comments were submitted. Supporting documents may be found in the docket.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kristy A.N. Bulleit

On Behalf Of:

Hunton &Williams o/b/o UWAG (Utility Water Act Group)

Author ID Number:

316bNFR.212

Comment ID 316bNFR.212.001

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name Kristy A.N. Bulleit

Organization Hunton &Williams o/b/o UWAG (Utility Water Act Group)

The following table summarizes the capital cost estimates developed for new once-through, recirculated wet, and indirect dry cooling systems. These cost estimates were prepared assuming a new 750-MW combined cycle power plant and using the approach described in our recent "Wet vs Dry Cooling" report

Estimated Cooling System Capital Costs for a 750-MW Combined Cycle Power Plant

	Capital Costs ($ Millions)		
Regional Group	Once-Through	Wet	Dry
1 - Northeastern U.S. (Albany, NY)	16.0	25.2	60.0
2 - Upper Central U.S. (Madison, WI)	16.2	25.4	60.7
3 - Southeastern U.S. (Atlanta, GA)	14.6	23.2	56.2
4 - Lower Central U.S. (Amarillo, TX)	13.3	21.3	52.1
5 - Western U.S. (Sacramento, CA)	18.1	28.0	66.0

The cost differences between once-through and recirculated wet cooling systems primarily are related to three equipment items: the cooling water intake structure, the main steam condenser, and the cooling tower. Although a once-through system will have a larger intake structure and main steam condenser than a recirculated wet system for a comparable heat rejection, the absence of a cooling tower makes the capital costs for the once-through system much lower.

EPA Response

As noted in response to comments 316bNFR.368.006, 316bNFR.368.008, 316bNFR.368.009, and 316bNFR.368.011 the cost estimates presented by the commenter for installation of wet and dry cooling towers at hypothetical, modeled new facilities are not directly comparable to the defensible cost estimates developed by EPA.

As stated by the commenter, "the cost differences between once-through and recirculated wet cooling systems primarily are related to three equipment items: the cooling water intake structure, the main steam condenser, and the cooling tower." The costs presented by the commenter for cooling towers (especially wet cooling towers) cannot be fully attributed to the 316(b) final rule. Regardless of the final configuration of the cooling system at a new power plant, the main steam condenser will be similar for once-through and wet cooling tower systems. The size, and subsequent cost, of the intake will be significantly smaller for a wet cooling tower over a once-through design, and therefore some cost savings will be seen in this area for plants changing designs from once-through to wet towers. Therefore, a reasonable estimate of the marginal cost of a wet cooling tower over a once-through system can only be derived by subtracting the once-through system costs from the recirculating wet cooling tower costs. If this is calculated using the data submitted by the commenter, a wet cooling

tower installation over a once-through system at the average 750-MW plant in their models would have an estimated compliance capital cost of $9.0 million. For the final rule, EPA estimates that the marginal compliance capital cost of meeting the Track I flow reduction and velocity requirements (i.e., installing a cooling tower and a low velocity intake) over a once-through system at a 1050-MW (average size) combined cycle power plant is $10.3 million. Although not directly comparable, the $9.0 million ($11,973 per MW) estimated by the commenter and the $10.3 million ($9,825 per MW) estimated by EPA are not unreasonably different. Regardless, the discussion below explains how the estimates differ.

As stated in comment 316bNFR.068.330, the commenter estimates that the design temperature approach for each recirculating wet-cooling tower will be 8 deg F. This estimate is not accurate for development of national cost estimates and will overstate the required size and, therefore, capital costs of a wet cooling tower. EPA has determined that its estimate of 10 deg F for design approach is representative of recent industry practice and current construction trends. EPA presented considerable information in the NODA to document and support its proposal estimate of design approach for wet cooling towers. The commenter provides no supporting evidence to justify the 8 deg F design choice outside of referring to current "practice." The commenter also does not provide any supplemental information in comments to the NODA to counter EPA's evidence. As such, EPA continues to view 10 deg F as the appropriate estimate of design approach for wet cooling towers. Consequently, the cost estimates presented by the commenter for wet cooling towers are higher than appropriate for national cost estimates. The capital costs of the towers modeled by the commenter, by assuming an 8 deg F approach, exceed those of smaller 10 deg F towers by as much as 15 percent. (This estimate was provided by the commenter as a footnote to comment 316bNFR.068.329). The O&M costs would be similarly overestimated.

See response to comment 316bNFR.368.012 for further discussion of differences between the commenter's facility level estimates for wet and dry cooling towers compared to EPA's estimates.

EPA concludes that its estimates of capital costs for the installation of cooling towers are appropriate for national cost estimates.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

John E. Burns OBO UWAG

On Behalf Of:

Utility Water Act Group

Author ID Number:

316bNFR.368

Note

Appendix F to main UWAG comments

Comment ID 316bNFR.368.001

Author Name John E. Burns OBO UWAG

Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The most frequently considered water-conserving alternative for new power plants is recirculated cooling systems with mechanical draft towers. In some cases, natural draft towers have been used. Direct dry cooling systems may be considered an alternative. Generally, however, dry systems are not considered to be a viable, cost-effective design choice unless there are unique circumstances and conditions associated with the either the site or the market climate for the project. Furthermore, although these alternatives differ in several ways, the most distinctive difference is that recirculated systems evaporate water for cooling while direct dry systems do not. Therefore, in this report recirculated cooling systems with mechanical draft towers are referred to as “wet” cooling and direct dry cooling systems are referred to as “dry” cooling.

EPA Response

EPA agrees with the comment.

Comment ID 316bNFR.368.002

Author Name John E. Burns OBO UWAG

Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

In theory, the term “dry cooling” implies the total absence of water. But in practice, “dry cooling” means the transfer of heat to the atmosphere without the evaporative loss of water. For example, automobiles use a type of dry cooling system to control engine temperatures. Water is circulated through the engine block to absorb heat, then through the radiator to dissipate heat, and then back to the engine block. The heat transfer from the engine to the atmosphere is said to be “indirect” because the intermediate steps of heating and cooling the water occur at two different locations and times in the cycle. The system is also said to be “dry” (or completely closed) because none of the water evaporates; makeup to the system is only required to offset minor losses, such as leaks.

Indirect dry cooling would only be considered for retrofit situations at existing power plants since a water-cooled condenser would already be in place for a once-through or recirculated cooling system. Historically, however, an indirect dry cooling system has never been used in such a case because the performance is very poor and the cost is very high. In addition, indirect dry cooling has never been used for new construction in the United States. However, it has been applied in a relatively few cases throughout the world (primarily in Eastern Europe and the Middle East) in connection with a special cooling design.

EPA Response

EPA agrees with the technical descriptions of dry cooling in the comment. Application of dry cooling is discussed in the Technical Development Document, Chapter 4.

Comment ID 316bNFR.368.003

Author Name John E. Burns OBO UWAG

Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

For new power plants, a direct dry cooling approach is more cost-effective. In direct dry cooling, the turbine exhaust steam is piped directly to an air-cooled, finned-tube condenser, commonly referred to as the dry cooling tower (see Figure 2). The steam exhaust duct has a large diameter and as short a length as possible to minimize pressure losses. The finned tubes on the condenser are frequently arranged in an A-frame or delta pattern to reduce the required land area. Because finned-tube condensers have a low heat transfer coefficient, they are commonly quite large. Air is typically forced across the finned tubes by fans to improve heat rejection to the atmosphere.. Since direct dry condensers rely strictly on sensible heat transfer, a large quantity of air must be supplied, requiring a correspondly larger number of fans than would be used in a wet cooling system. The fans are installed on the cooler, inlet air side of the condenser to: a) reduce the power consumption for a given air mass flow rate, b) allow the use of less expensive materials of construction, and c) improve access and ease of maintenance.

{see hard copy for figure}

Figure 2 - Direct Air-Cooled Steam Turbine Condensing System <FN 2>

Unfortunately, a forced-draft fan system often does not produce a uniform air flow distribution through the tower and it results in a relatively low warm air escape velocity from the top of the tube bundle. This latter characteristic can be extremely important because in a wind it increases the potential for recirculation of the hot air plume back through the tower instead of drawing in fresh ambient air. <FN 3> Compared to wet cooling towers with the high-velocity plumes produced by induced draft fans, the low exit air velocities associated with dry towers exacerbate the recirculation problems in these systems. Therefore, anti-recirculation fences or windwalls may be required to prevent such problems. <FN 4>

In addition, the air-cooled finned tubes are subject to freezing in the winter and are exposed to the elements (such as rain, hail, pollen and solar radiation), all of which can measurably change performance. If hail is anticipated, special screens must be installed to protect the finned surfaces from damage. Although wet cooling towers also must operate and withstand the same weather elements, they are much hardier and damage to them do not immediately and directly affect the operation of the power cycle. For instance, in a direct dry cooling tower, when one of the tubes freezes, it often splits. After thawing, the tube rupture can produce a sufficiently large air leak into the steam space that it could curtail operation. The leak also can introduce high levels of dissolved oxygen in the condensate that would increase boiler tube corrosion. Furthermore, locating and repairing the damaged tube from among thousands of tubes in a structure that is elevated off the ground by about 100 feet are difficult. In contrast, when a minor amount of ice occurs in a wet cooling tower, no equivalent impact occurs. The wet tower structure and fill are designed to be unaffected by freezing and are not directly coupled to the power cycle.

Footnotes

2 Kroger, Detlev G. "Air-Cooled Heat Exchangers and Cooling Towers", Begell House, Inc., New York, NY, 1998.

3 Swanekamp, Robert. “Profit from Latest Experience with Air-Cooled Condensers”, Power, June 1994, p. 78.

4 Kosten, H., et.al. “Operating Experience and Performance Testing of the World’s Largest Air-Cooled Condenser”, Proceedings of the American Power Conference, Chicago, IL, 1981.

EPA Response

Paragraph 1. EPA agrees with the comment.

Paragraph 2. EPA notes that advances in design for air recirculation minimization have been made since 1994 (the date of the reference). The fences noted by the commenter are a common design feature characteristic of plants in areas with significant wind gusts (for example, the El Dorado Power Plant in Nevada). In addition, manufacturers and designers of modern systems frequently guarantee performance (without influences of air recirculation) up to specified wind speeds. See response to comments 316bNFR.524.026 and 316bNFR.501.024.

Paragraph 3. EPA disagrees that freezing is a significant problem in the operation and design of newer dry cooled plants. Modern designs incorporate automated operational measures to alleviate freezing conditions. Tube strength and design improvements have also advanced such that freezing and subsequent bursting of the tube bundles are no longer a serious issue in cold climates (reference: Air Cooled Condenser section of the Standard Handbook of Power Plant Engineering). EPA is unaware of situations where hail has damaged dry cooling installations. The commenter also provides no evidence to support the claim. Pollen and dust deposition, on the other hand, plays a significant role in system performance efficiency of dry cooling, as described to EPA by designers and operators of multiple dry cooling systems in disparate climates and according the above reference. Finally, EPA agrees that freezing problems are abated easily or not an influence in wet cooling designs.

Comment ID 316bNFR.368.004

Author Name John E. Burns OBO UWAG

Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

While the performance of wet cooling systems depends primarily upon the ambient wet-bulb temperature, the performance of dry cooling systems is determined by the dry-bulb temperature of the surrounding air. For dry cooling, the difference between the turbine exhaust steam temperature and the anticipated inlet air dry-bulb temperature is a key design value referred to as the "initial temperature difference" or ITD. Because ambient dry-bulb temperatures are usually higher than wet-bulb temperatures and tend to experience more dramatic daily and seasonal fluctuations, the design and operation of dry cooling systems linked to steam turbine-generators can be more problematic than for wet cooling systems. If the dry cooling system is unable to meet design heat transfer conditions in the condenser, then the turbine backpressure will increase and the plant generation will decrease. With a reasonably flexible steam turbine design, a higher backpressure and the associated decline in generating efficiency (or energy penalty) can be operationally tolerated up to a point. But as the turbine backpressure increases, at some point an alarm will warn operators that the turbine-generator is approaching limits set by the equipment manufacturer. Eventually, if steam cooling and condensation worsen, then either the steam flow to the turbine must be reduced (known as a plant derate because the amount of electricity which can be generated is reduced) or the steam-turbine generator portion of the CC plant must be temporarily shutdown.

Although the water-conserving advantage of dry cooling has increased the interest in and use of this technology (particularly at smaller facilities), the potential for incurring energy penalties due to operation at elevated turbine backpressures and/or plant derates limit its use in locations with high daily or seasonal dry-bulb temperatures. Though it is difficult to absolutely categorize a high temperature limit, when ambient temperatures exceed 90°F, the relative performance of a dry cooling system will begin to suffer appreciably.

EPA Response

Paragraph 1. EPA agrees with the comment and notes that such issues are a concern at even the most recently constructed dry cooling installations. In fact, some new turbines (specially suited for the elevated backpressures of dry cooling) are manufactured with auto-shutdown mechanisms for situations when backpressure exceeds design levels. The turbine will "trip the alarm" when a particular backpressure limit is exceeded and the steam turbine will shutdown for significant periods of time (usually resulting in a plant wide shutdown, as the steam turbine bypass is not instantaneous at all plants). This phenomenon occurs at even the most recently constructed and most advanced plants in the US. It also occurs at the period corresponding to the peak demand for electricity.

Paragraph 2. EPA agrees with the comment.

Comment ID 316bNFR.368.005

Author Name John E. Burns OBO UWAG

Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

In some circumstances, a combination of wet and dry cooling systems may be helpful in addressing certain site-specific issues. The nature of these "hybrid" systems can vary depending upon the particular situation and objectives. Some hybrid systems are designed to compensate for the decline in performance of a dry cooling system at higher ambient dry-bulb temperatures. These hybrid systems essentially incorporate a wet-cooling component to provide supplemental cooling. But this type of wet/dry system typically has been used in situations with fairly small cooling requirements. Therefore, the technology and the associated economics for these hybrid systems remain uncertain for large-scale applications (on the order of 250 MW).

By far, the most common type of hybrid system is designed to eliminate the visible plume leaving the tower in a wet recirculated system. Hybrid plume abatement systems basically consist of an indirect dry cooling system located immediately above the cooling tower portion of a wet cooling system. Hot cooling water from the condenser is fed first to the indirect-contact, air-cooled, finned-tube heat exchangers and then to the direct-contact fill in the tower. Ambient air also is drawn through both the dry and wet segments in parallel paths. The two air streams are then mixed and exhausted from the stack of the induced-draft fan at the top of the tower. The hot, dry air from the air-cooled heat exchangers increases the temperature and decreases the relative humidity of the cooler, saturated air from the fill so that the mixture leaving the tower does not have a visible plume. Operators can control the degree of visual plume abatement by adjusting hinged damper doors along the air inlet to the dry cooling section to govern the air flow and, consequently, the volume and temperature of hot, dry air in the outlet air mixture.

Hybrid plume abatement systems are not water-conserving systems. Furthermore, these systems should not be confused with other wet/dry hybrids in which the wet portion of the cooling system is designed and operated to compensate for the reduced performance of the dry portion during periods of high ambient dry-bulb temperatures. The hybrid system described above is an option only when plume abatement for a wet cooling tower is an issue, and would be expected to result in a higher overall cost for the tower than if the system were built without plume abatement.

EPA Response

EPA agrees with the comment.

Comment ID 316bNFR.368.006

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name John E. Burns OBO UWAG
Organization Utility Water Act Group

A generic base-case study approach was followed to develop meaningful cost estimates for the wet and dry cooling systems of combined-cycle units. Since the cost estimating methodology included certain site-specific factors, EIA combined cycle capacity forecasts were used to identify several sites representative of anticipated growth. These same EIA data were then used to extrapolate site-specific cost estimates to regional and nationwide cost projections for the next twenty years. The four-step process involved:

1. Definition of a generic base-case CC power plant.
2. Identification of geographic areas based on anticipated new CC power plant capacity and selection of representative sites for base-case analysis.
3. Preparation of base-case capital and O&M costs for wet and dry cooling systems at each selected site.
4. Extrapolation of base-case results to develop regional and overall national cost estimates.

This approach was used for several reasons. A generic base case adequately establishes the details necessary for making reasonable and reliable cost estimates. In addition, a base case effectively fixes all parameters not directly related to the choice of cooling system, so that any comparison of cost estimates is not improperly influenced by external factors. The use of representative sites for different geographic areas enabled the study to consider the potential importance of different local parameters (such as climatic conditions). It also ensured that subsequent extrapolation of base-case results to the national level would not be improperly skewed by a single cost estimate which might unknowingly reflect a best or worst case scenario.

EPA Response

Paragraph 1. EPA notes that absent from the process/approach outlined by the commenter is identification of the baseline (installed) cooling system projections for the new combined-cycle plants. Even though the commenter states that the “base-case” capital and operations and maintenance costs are developed at each site, these costs do not correspond to realistic projected baseline cooling systems. See the Economic Analysis for a profile of the baseline cooling systems that would be installed in absence of this final rule. EPA also notes that the commenter gives no indication as to the expected intake flows of the EIA projections, the sizes of the plants, nor the percent of plants not using waters of the US. EPA’s estimates exclude plants that do not withdraw from waters of the US; the estimates exclude those not exceeding the flow threshold cut-off level for cooling intake; and those expected to install cooling towers at baseline do not incur the cost of installing cooling towers under this rule. Therefore, comparison of the commenter’s national costs to EPA's national cost estimates makes the commenter's estimates decidedly inflated. However, after taking into account differences in baseline cooling systems and differences in appropriate design assumptions the capital and operation and maintenance costs of this study are relatively comparable to those developed by EPA.

Paragraph 2. EPA reiterates the comments made above regarding the commenter's lack of definition for baseline cooling systems projected to be installed at new plants. EPA agrees that local parameters can be important in costs estimates, as evidenced by EPA's energy penalty analysis. See Chapter 3 of the Technical Development Document.

The generic base case chosen for this study is a 750 MW combined cycle power plant with two 250 MW gas turbine-generators followed by one 250 MW steam turbine-generator which uses fresh water for its cooling needs. Although the typical nameplate rating for CC plants during the last decade has been somewhat smaller, the trend in capacity for plants announced and already under construction is increasing. <FN 5, 6> For the period covered by this study (2000-2020), the 750 MW capacity adopted for the base case is consistent with this trend.

Brackish water and salt water cooling systems were not considered in this study because the number of new CC plants using either brackish water or salt water for wet cooling system makeup is expected to be relatively small compared to the number of new CC plants which will be using fresh water. However, brackish water or salt water cooling systems would be more costly than similar fresh water cooling systems. In a brackish water or salt water cooling system, the tower is slightly larger; more corrosion-resistant materials and coatings would be required; cathodic protection needs would be greater; and makeup and blowdown systems would be larger. All of these added requirements would be very site-specific and so no typical cost factor can be accurately provided. Even so, the estimated cost for a wet cooling system using either brackish water or salt water for makeup should still be appreciably lower than the cost for a dry cooling system at a new CC plant of similar size.

For cost estimating purposes, the generic base case also was assumed to use a single steam turbine design for both wet and dry cooling systems. Historically, steam turbine/condenser designs for large fossil and nuclear power plants have been optimized to reflect the type of cooling system as well as other site-specific conditions. However, as the effects of deregulation spread through the electric utility industry, plant design and construction schedules have decreased and equipment delivery times have increased. As a result, designers often rely on more flexible steam turbines which operate over a wider range of backpressures, even if it means accepting an energy penalty under certain operating conditions.7 While some project designers may have the opportunity to consider more detailed turbine/cooling system optimizations approaches, the additional time required will have its own cost impacts in the capital market and each optimization would be highly site-specifiic. Thus, for the purposes of this analysis, the assumption has been made that a flexible steam turbine will be used in most cases.

An exhaust steam flow of 1.7 million lbm/hr for the 250 MW steam turbine was taken as representative and was considered to be the same for both the wet and dry cooling systems. Certain fixed cooling system parameters for the wet case (approach, range, and terminal temperature difference or TTD) and the dry case (initial temperature difference or ITD) were combined with site-specific design point climatic conditions (ambient wet-bulb and dry-bulb temperatures) to determine the exhaust steam temperature and its corresponding saturation pressure. Using a typical steam-turbine expansion characteristic then eliminated the necessity for a total plant cycle heat balance to estimate the performance of the cooling system. The net generation (MW) of the steam turbine was calculated from these values and a generic turbine response curve. This curve was developed specifically for the base case turbine, relying on design data from similar commercial steam turbines

and the inherent capability of modern turbine designs to effectively produce generation between given inlet and exhaust steam conditions (see Appendix A).

Although condensation of exhaust steam from the steam turbine represents the predominant cooling demand in a combined cycle power plant, there are other auxiliary cooling needs that must be met as well. These auxiliary cooling loads are relatively small (typically 5% of the steam condenser heat transfer load), but critical to the overall power generation process. For example, certain auxiliary cooling heat exchangers (such as turbine lube oil coolers) require cooling water temperatures that cannot be exceeded without violating equipment manufacturer's warranty specifications.

As a result, auxiliary cooling would be different for the wet and dry cooling systems. For the wet cooling base case analyses, the design capacity of the recirculated cooling system and its direct capital cost were considered as increased by 5%. For the dry cooling base case analyses, there is no cooling water which could be used to meet auxiliary cooling needs (in direct dry cooling, the turbine exhaust steam is piped directly to an air-cooled, finned-tube condenser). Therefore, a separate indirect dry cooling system (i.e., a fan-cooled finned heat exchanger similar to but larger than an automobile radiator) was included to meet auxiliary cooling needs. In addition, to accommodate the higher cooling water temperatures occurring in an indirect dry auxiliary cooling system, key heat exchangers (such as the turbine lube oil coolers) were enlarged to provide greater heat transfer. Compared to a wet cooling system, the much greater costs for all of the extra component requirements in the indirect auxiliary system were nonetheless considered to be accounted for in the same 5% cost factor used for wet cooling systems.

Footnotes

5 Schimmoller, Brian K. "Fueling the Boom". Power Engineering, March 2000, p. 30.

6 Swanekamp, Robert. "Gas Turbines, Combined Cycles Harvest Record Orders" Power, March/April 2000, p. 30.

EPA Response

Paragraph 1. The capacity of the plant used as a model in the commenter's analysis is similar to the average sized combined-cycle plant within the scope of this rule. Therefore, some comparison on a facility level with EPA's cost estimates is possible, if additional and unnecessary cost elements are removed from the commenter's analysis and differences in design parameters are accounted for in the comparison. EPA notes that although the commenter uses a similar model plant size to the average combined-cycle facility within the scope of the final rule, the national estimates derived by the commenter are not comparable to EPA's estimates. See response to comment 316bNFR.368.006.

Paragraph 2. EPA agrees with the comment. However, the Agency has developed national averages for salt/brackish water cooling systems for the final rule.

Paragraph 3. EPA agrees with the comment.

Paragraph 4. EPA finds that the commenter's steam flow estimate is reasonable.

Paragraph 5. EPA agrees that the approach is reasonable.

Paragraphs 6 & 7. The approach is reasonable. However, EPA notes that the inclusion of the additional cooling system needs should have a small influence on capital and operation and maintenance costs of the modeled systems. In addition, the auxiliary cooling system costs should be identical for once-through, wet cooling tower, and dry cooling systems. Therefore, EPA does not consider these costs in the marginal cost estimates of the rule.

Comment ID 316bNFR.368.008

Author Name John E. Burns OBO UWAG

Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Installing either a wet or dry cooling system as part of a power plant requires many more activities and includes many more components than the towers themselves. Though the towers are major cost contributors, the overall capital cost of either a wet or dry cooling system is an aggregate of all the elements that comprise that cooling system. <FN 10>

The methodology for developing the base case capital costs for the wet and dry cooling systems is illustrated by reference to Appendix D and E. The total costs were determined by the methods traditionally used by architect-engineers for utility projects. All major costs of the elements from the connection of the plant cooling system at the turbine flange outward to the cooling tower are included. Algorithms were used to estimate specific installed cooling tower costs based on past bid costs. The majority of the other cost components were individually determined using published data <FN 11>, other recent cooling system cost estimates or previous equipment quotes, along with an estimate of the quantity of materials involved or a size delineation. A description and cost for each of the major system components is included in the city cost listings (see Appendixes D and E as examples).

In addition, the following details apply to all capital cost estimates:

• Lo-noise fans were included due to the general sensitivity of most local communities to the relatively pervasive noise from cooling towers (wet and dry).

• Wiring costs were assumed to be similar to factors developed by the Marley Cooling Tower Company. <FN 12>

• A 1% hot-weather incidence value for both wet and dry towers was selected as typical, based on design process data from the Marley Cooling Tower Company.<FN 9>

• Construction costs were taken as the overnight type, i.e., considered to be completed so quickly that interest on the amount of a contract was negligible. By not including the interest during construction, the resulting estimated construction costs are slightly lower than normally would be incurred. These costs were commonly adjusted to a July 1999 basis using factors developed by RS Means. <FN 11>

• The nominal construction related cost proportion was further adjusted to the particular city site in accordance with the RS Means Location Factor. <FN 11>

• The usual project allowances included by architect-engineers for utility projects were added for management, engineering, indirect costs (such as detailed site engineering, permits, licenses, taxes, etc.) and contingencies. These latter factors added a total of 35% to the direct capital costs of the projects but are considered to be reasonable for the typical power plant cooling system installation.

Operating and maintenance (O&M) costs were based on a combination of several cost factors. For both the wet and dry cooling system, the annual maintenance costs of the entire cooling system

equipment were assumed as 1% of the capital costs. This figure reflects past estimates <FN 12> and recent experience with power plant towers, condensers, circulating water pumps and intakes. This figure also includes both labor and equipment maintenance. The cost of system auxiliary power was determined by: 1) estimating the fan power and hydraulic pump power (for wet cooling systems) requirements, and 2) adjusting these power requirements by assuming a 90% CC plant capacity factor, and 3) multiplying the adjusted power requirement by a unit cost of $25/MW-hr.

In the case of the wet cooling system, operating costs addressed a current typical makeup scenario. This assessment is usually reasonable and considered the costs of water consumption based on pumping makeup to a cooling tower basin from a cooling intake with water that is freely available from a local natural waterbody and the return of that wet cooling system blowdown to the same source without treatment. The evaluation also took into account water treatment within the plant to maintain cooling system water quality and to minimimize biofouling, corrosion, etc. This detailed aspect of the study was based on parameters listed in Table 2. But in the final analysis, the resulting costs were considered to be so small that they were not included in the overall cost estimate.

Footnotes

9 Standards for Steam Surface Condensers, 9th ed. Heat Exchange Institute, 1995.

10 Burns, J.M., et.al., "The Impacts of Retrofitting Cooling Towers at a Large Power Station", Proceedings of the EPRI Cooling Tower Conference, St. Petersburg, FL, August 1994.

11 Means, R.S., Heavy Construction Cost Data - 2000, 14th ed., 1999.

12 Managing Waste Heat with the Water Cooling Tower, 2nd ed. Marley Company, Overland Park, KS, 1973.

EPA Response

Paragraph 1. EPA disagrees with the methodology that defines "the overall capital cost of either a wet or dry cooling system as an aggregate of all the elements that comprise that system." This represents a critical difference between EPA's and the commenter's facility level cost estimates for compliance costs of cooling tower installations. The commenter, by including the capital and operation and maintenance costs of a surface condenser and associated conduit systems, has significantly overstated the costs of a cooling tower installation, especially for wet cooling towers. This is exacerbated on the scale of their projected national cost estimates by the fact that the commenter does not recognize the baseline cooling systems that would be installed at the new plants (i.e., the majority will install wet cooling towers to begin with). See also response to comment 316bNFR.368.006.

Paragraph 2. EPA notes that, as described in the preceding paragraph, "major costs of the elements from the connection of the plant cooling system at the turbine flange outward," is not an appropriate basis of comparison to the costs developed for EPA's final rule. As such, elements of the cooling tower costs will be clearly inflated. Otherwise, the facility level cost estimation methodology outlined is reasonable.

Response 3. EPA agrees that the annual operation and maintenance costs may be assumed to be a percentage of the capital costs of "the entire cooling system." However, EPA disagrees (as noted in response to comment 316bNFR.368.006) with what should comprise the "entire cooling system".

EPA notes that, for the final rule, it has developed detailed operation and maintenance costs and presents them in Chapter 2 of the Technical Development Document.

Response 4. EPA agrees with the statements regarding water treatment costs.

Generally, the methodology presented by the commenter differs slightly from that used by EPA in the final rule. However, the two general approaches are fundamentally similar for cost estimation of the actual cooling towers (and not auxiliary cooling components such as condensers). See Chapter 2 of the Technical Development Document.

The wet cooling system cost has many more equipment components than the dry system; however, these components also are relatively simple. The recirculating water flow rate was estimated from the turbine heat load and the range shown in Table 2. Only counterflow towers were assumed in this analysis because they are more energy efficient, provide a better winter design, and allow a closer thermal approach. <FN 13>

Many of the wet system major costs were assessed in algorithms by using the $/gpm rule-of-thumb. It is a pertinent and descriptive parameter because the size of the wet cooling system equipment is directly related to gpm. For example, that approach was used within this base case analysis to estimate the capital cost of the cooling tower, piping and the pumps, with two important caveats. First, as had been noted earlier, wet towers at power plants generally are designed and purchased for an approach of about 8 °F. Therefore, the cost of equivalent thermal performance demand of a counterflow tower for an 8 °F approach was assessed <FN 14> and a wet mechanical-draft cooling tower capital cost estimate of $35/gpm was utilized. Second, it is traditional to buy power plant cooling towers as furnished and erected. With this understanding, the capital cost factor above and the estimated tower cost shown in Appendix E include installation for the base-case wet cooling system.

Based on past experiences with similar power plant wet cooling towers, the size (ground area footprint) for one cell of the base-case generic tower would be about 42 feet by 54 feet. Each cell would have a single, 30-ft diameter fan, with a fan stack height of approximately 55 feet. The total tower would consist of twelve cells in a back-to-back configuration. The complete tower structure would be about 325 feet long and 85 feet wide or roughly half the size of a football field.

The steam surface condenser size and cost were estimated from past cost data by determining the necessary heat transfer surface area. Thus, the primary installed cost parameter is a $/ft2 value with an adjustment factor to reflect the type of tubing. For this base case, 304 stainless steel tubing was chosen for the condenser because it is a reasonably high-grade material that provides suitable performance and service life at a relatively low capital cost. However, for condenser applications in more corrosive applications (such as salt water or brackish water environments), more expensive materials (e.g., titanium) would be required.

The auxiliary cooling system was assumed to be a recirculating type, separate from the main cooling tower. The direct capital costs for this system were assumed to cost 5% of the direct capital costs of the main condenser cooling system. The additional makeup water required for the auxiliary cooling system and the related operating costs were assumed to be negligible. Maintenance costs were included within the 1% capital cost factor used to estimate maintenance for the main condenser cooling system.

Footnotes

13 Burns, J.M. and D. Brocard, “Cooling Towers” (Section 4.8 in the Handbook of Energy Systems Engineering), J. Wiley & Sons, New York, NY, 1985.

14. “Cooling Tower Performance Curves”, Cooling Technology Institute, Houston, TX, 1967.

EPA Response

Paragraphs 1 & 2. EPA agrees with most of the design choices made by the commenter, but notes that the thermal design “approach” used in this study differs from EPA’s value of 10 deg F. See response to comments 316bNFR.501.024 and 316bNFR.524.046. EPA notes that the commenter has not provided data on actual installations of recent cooling towers in this submission or for any subsequent comment periods to substantiate the design choice of an 8 deg F thermal approach. EPA notes, again, that the “base-case” once-through wet cooling system is included in capital and operation and maintenance costs for the commenter’s estimates. See response to comment 316bNFR.368.006. EPA also notes that inclusion of noise abatement fans for the wet cooling tower design choices does not match recent trends in new cooling tower construction. See Chapter 2 of the Technical Development Document.

Paragraph 3. The land area estimates presented here are reasonable, in EPA’s view.

Paragraph 4. Again, surface condenser costs are not applicable for a comparison to EPA’s cooling tower estimates for the final rule. See response to comment 316bNFR.368.006.

Paragraph 5. EPA agrees that the estimates are reasonable, but notes that auxiliary cooling will be identical in cost between once-through cooling and recirculating cooling at a new plant, and therefore was not included in EPA's estimates of marginal cost estimates to upgrade cooling systems.

Comment ID 316bNFR.368.010

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Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

For direct dry cooling systems, capital costs cannot be estimated from the well known "$/gpm" rule-of-thumb used with wet cooling towers. This parameter is meaningless and any cost estimating approach using such a factor is irrelevant because direct dry cooling systems have no cooling water flow, only condensing steam. Because a direct dry cooling tower conveys the waste heat directly to the surrounding ambient air, other system parameters must be considered to determine an appropriately based capital cost factor.

With specific engineering relationships, the total heat transfer area of the finned surfaces on the dry cooling tower can be shown to be proportional to a particular set of turbine exhaust and ambient conditions combined with the total heat load on the tower. In addition, a large dry tower of the type that might be used at a power plant is comprised of several identical sections that could be considered as typical size fan cells. That typical fan has a characteristic by which the air-flow through the cell can be estimated. Finally, most of the construction materials used on dry towers suitable for power plants also are very similar. As a result, dry tower capital costs can be best quantified and projected from past cost data by determining the necessary heat transfer area and the number of cells required for a particular power plant application. Still, a capital cost parameter developed in this manner would only cover the cost of the manufactured equipment, which traditionally is bid only as "furnished". Therefore, the "purchased" capital cost parameter was adjusted to determine a final "erected" capital cost parameter.

Using the same heat transfer methodology described above, the characteristics for a generic base-case dry cooling tower also were determined. The site plan area was estimated to be 250 feet by 250 feet (approximately 1.4 acres) or about the same size as a football field. The structure for one of these dry towers would be about 105 feet high at the tallest point and have at least 40 fans, each 30 feet in diameter.

A direct dry cooling system has no source of cooling water to meet the auxiliary cooling demands within the plant. So an additional indirect dry cooling system must be installed to provide the needed cooling water. Consequently, for the dry cooling system base-case, a separate, smaller closed cooling water loop with heat rejection to the atmosphere by means of fan-cooled finned heat exchangers was selected to meet auxiliary cooling requirements. Such an auxiliary dry cooling system has many disadvantages, including: 1) the built-in inefficiency of an indirect system, 2) the added complexity of maintaining operation during the winter without freezing any of the thousands of water-filled tubes exposed to the atmosphere, and 3) the difficulty of achieving adequate performance for safe operation of the turbine systems during hot weather.

Despite these inherent drawbacks, which would serve to amplify the capital and operating costs, the same cost factors assumed for a simpler wet cooling system were used to develop dry cooling system cost estimates. The capital costs for the auxiliary dry system were assumed to be 5% of the main dry cooling system capital cost, and the maintenance costs were included within the 1% O&M cost estimate envelope of the main dry cooling system. Doing so ensured that the capital and O&M costs

associated with auxiliary cooling in the dry cooling system base case were not overstated.

EPA Response

Paragraph 1. EPA agrees that rule-of-thumb estimates for dry cooling towers are not "well-known." However, EPA disagrees that these types of estimates are irrelevant, especially when they are empirically verified, as is the case for EPA's estimates. See Chapter 4 of the Technical Development Document.

Paragraph 2. EPA finds the methodology described for determining capital costs of dry cooling systems to be reasonable. However, EPA notes that several design choices for the commenter's analysis differ from EPA's choices. See response to comment 316bNFR.368.012.

Paragraph 3. EPA agrees with the land area estimates.

Paragraph 4. EPA agrees with the approach for estimating auxiliary cooling for a dry cooling system presuming that a dry cooling system would be used for auxiliary cooling. EPA notes that this will not always be the case, and as such, considers that the commenter will have overstated the comparative costs somewhat by including this factor. Regarding the winterization issues of dry cooling, EPA believes that these are overemphasized by the commenter. See response to comment 316bNFR.368.003.

Paragraph 5. EPA agrees with the statements in this paragraph.

Comment ID 316bNFR.368.011

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Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The regional and national projections of capital costs, O&M costs and the summer peak performance shortfalls (energy penalties) for the wet and dry cooling systems were determined by combining the results of EIA 20-year forecasts for CC capacity growth with the base-case data. These separate evaluations were described previously. The number or fraction of generic 750 MW generating units was determined for a yearly projection of installed power in each of the five geographic groups.

The 1999 capital and O&M costs were inflated by 4% per year to be approximately consistent with the historical inflation index reported by RS Means for the past 20 years. To provide a uniform cost base for the results of this analysis, all costs were then brought back to 1999 (given as a calculated present worth value for July 1999) using an annual 7% discount rate. The operating and maintenance costs were projected for the next 30 years to 2030 using the same approach and factors for inflation and present worth.

The summer shortfall is defined as the aggregate loss in nominal 250-MW generation in the peak (design) summer period due to the cooling system performance loss in hot weather and the station cooling system auxiliary power demand. As has been discussed, this period is considered to occur about 30 hrs per year if the weather is normal, but could be much greater in length if the summer weather was extreme.

EPA Response

Paragraph 1. Because of the oversimplified approach adopted by the commenter -- which includes unrealistic “base-case” cooling (i.e., based on once-through cooling for all new plants) and inappropriate assumptions regarding inclusion of capital and operation and maintenance costs for condenser/conduit systems along with cooling tower costs -- make the national estimates of the commenter. See response to comment 316bNFR.368.006 for EPA's objections to the approach adopted by the commenter for projecting national estimates.

Paragraph 2. EPA views the approach for estimating annualized costs as reasonable.

Paragraph 3. EPA notes that by only referring to the peak energy penalty (or summer shortfall) for the steam turbine’s capacity (250-MW), the commenter’s data can be misleading when compared to conventional, plant-wide estimates. Therefore, any penalty presented by the commenter needs to be divided a factor of 3 to represent the plant-wide energy penalty. EPA agrees with the general approach described for defining the duration of the peak-summer shortfall operating period.

For the base-case study (750 MW CC power plant with a 250 MW steam turbine-generator) at five different geographic sites, capital cost estimates for dry cooling systems were consistently greater than those for wet cooling systems by an average of 140% (see Table 5). Although there is appreciable capital cost variability for either the wet or the dry cooling systems between the different geographic sites, the majority of this variation reflects local construction cost factors and not climatic conditions.

{see hard copy for table}
Table 5 Estimated Capital and O&M Costs for 750-MW Base-Case Plant by Geographic Site

Annual O&M costs for dry cooling systems also were uniformly greater than those for wet cooling systems by an average of 94%. To a large extent, this difference in O&M costs reflects the much larger difference in capital costs because annual maintenance costs were assumed to be 1% of the capital costs. However, the auxiliary power requirements also contributed to the overall difference in O&M costs. As shown in Table 6, the auxiliary power requirements for dry cooling systems are estimated to be 77% higher than those for wet cooling systems.

{see hard copy for table}
Table 6 Estimated Auxiliary Power Requirements and Energy Penalties for Base-Case Plant by Geographic Site

But, a more important difference between wet and dry cooling is the predicted energy penalty (i.e., reduced plant generating capacity) for each system compared to the nominal 250 MW design rating of the steam turbine. The energy penalty is directly related to the climatic conditions of a specific site and would be expected to vary considerably throughout the United States. However, for both wet and dry cooling systems, the energy penalty normally is greatest during the hottest periods of the year. For the remainder of the year, the energy penalty should be much smaller. Unfortunately, the periods of greatest energy penalty typically coincide with the times of peak electricity consumption. As a result, any generating shortfall at that time represents a serious problem in meeting customer demand and a potentially significant revenue loss.

In addition, any energy penalty creates a need for replacement power which must be met by even more new generating capacity resulting in an increased potential for environmental impacts (such as increased air emissions). Estimating those emissions would mean projecting the costs of power production and the mix of generating capacities (coal-fired, nuclear, etc.) available at the time of anticipated demand over the next twenty years. Although such an effort was beyond the scope of this study, the importance of increased emissions produced as a direct result of the energy penalties attributed to reductions in cooling systems performance could be substantial and should not be overlooked.

EPA Response

Paragraphs 1 & 2. See response to comment 316bNFR.068.329 for further discussion of the wet cooling tower capital cost comparison presented by the commenter. EPA notes that the operation and maintenance estimates for wet towers presented by the commenter are slightly lower than those developed by EPA for a comparable cooling tower. In EPA's view, conservative estimates of the energy costs necessary for pumping, along with maintenance costs inclusive of maintenance of intakes and tower systems leads to more conservative estimates for EPA's data. In addition, though small, the effect of wastewater treatment ii not included in the commenter's estimates, whereas EPA's estimates do include this as a component of a scaled costing factor.

EPA notes that the wet cooling capital costs presented in Table 5 by the commenter are not comparable to those developed by EPA for wet cooling towers because of the reasons outlined in responses to comments 316bNFR.368.006, 316bNFR.368.008, 316bNFR.368.009, and 316bNFR.368.011. However, the commenter attaches an example wet cooling system capital cost calculation for a wet cooling system in Albany, New York that presents the itemized capital cost estimates used as the basis for the median plant in Table 5. EPA analyzed the itemized cost estimates provided in this table and notes, again, that the costs of the surface condenser and auxiliary cooling system (both items not appropriate for consideration in the context of costs attributable to this new facility rule) contribute significantly to the capital costs presented by the commenter (the surface condenser's contribution to total capital costs presented in the commenter's example is 33 percent of the cost of the cooling system while the auxiliary cooling system accounts for 5 percent). The commenter's example also utilizes a 15 percent contingency factor, which EPA considers high in the context of the new facility rule. EPA's cost estimates use a 10 percent contingency, as discussed in response to comment #316bNFR.039.039. After the differences in itemized cost components are resolved, the commenter's capital cost estimates for this example compare to EPA's favorably. Considering that the commenter's key design parameter for "approach" differs from EPA's estimate, which has the effect of increasing the size of the tower design (and therefore the costs) estimated by the commenter, the costs are comparable. Without changing the "approach" design value, the corrected commenter's median capital cost estimates for installed costs of wet cooling tower and intake systems exceed those developed by EPA by only 15 percent. The difference in costs caused by the "approach" design value would, in the end, more than account for this 15 percent cost difference. In addition, the commenter includes a cost component for noise abating fans. As discussed in Chapter 2 of the Technical Development Document, this cost component is not a common feature at recent cooling tower construction projects.

EPA notes that the installed capital cost estimates for dry cooling towers presented by the commenter exceed those developed by EPA on a facility level basis by approximately 45 percent. EPA examined the example dry cooling capital cost calculation for Albany, New York used as the basis for Table 5 and determined that the primary differences between the commenters costs for dry cooling and those for EPA arise from five basic areas: (1) the size of the cooling system estimated by the commenter exceeds that estimated by EPA for a similar capacity power plant; (2) the costs of the fans used in the commenters analysis exceed those of EPA's supporting cost examples on a unit basis; (3) EPA does not consider the auxiliary cooling costs accounted for by the commenter to be attributable costs of this rule; (4) the electrical wiring and circuitry costs estimated by the commenter appear much larger than would have been estimated by EPA had the cost been itemized separately in EPA's cost development;

and (5) the contingency fees assumed by the commenter exceed those used by EPA (note: the commenter estimates a 15 percent contingency versus the 10 percent figure used by EPA). Despite the differences in facility level dry cooling cost estimates between the commenter and EPA, the Agency has not adopted a dry cooling based regulatory option, in part due to the excessive costs and economic impacts of the technology, as assessed by the Agency (see Section V.C of the preamble to the final rule and Chapter 4 of the Technical Development Document). Therefore, the cost estimates of the dry cooling option, if the Agency were to use the facility level cost estimates submitted by the commenter, would be even less persuasive for the dry cooling options that EPA rejected.

Paragraph 3. See responses to comments 316bNFR.368.011 and 316bNFR.524.046 for discussions of the commenter's methodology for presenting energy penalties on a steam-turbine specific basis. For EPA's estimations of peak-summer shortfall energy penalties, see Chapter 3 of the Technical Development Document. EPA notes that the methodology for applying costs based on energy penalties for the final rule considers the mean annual energy penalty as the key component to costs developed for a national rule, as this penalty is applicable throughout the operating year. The consideration of peak-summer summer shortfalls is important in an evaluation of the technical feasibility of dry cooling, but was not factored into EPA's costing estimates directly. EPA agrees with the statements made by the commenter regarding peak-summer shortfalls coinciding with periods of the greatest demand for electricity.

Paragraph 4. EPA agrees with the comment and notes that it has estimated air emissions increases projected for the dry cooling regulatory alternative and for the final rule. See Chapter 3 of the Technical Development Document.

Comment ID 316bNFR.368.013

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Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Since the performance of dry cooling systems is linked to the ambient dry-bulb temperature (which can fluctuate significantly on a daily basis), dry cooling systems would be particularly sensitive to climatic variations. Even though this study selected only five sites for base-case analyses, the importance of climatic conditions at each location is evident from the range in dry cooling energy penalties (29.1 to 45.2 MW) shown in Table 6.

Furthermore, the magnitude of the energy penalty for dry cooling systems relative to wet cooling systems demonstrates the substantial economic impact that cooling system selection can have on power generation costs. Depending upon the prevailing price of replacement power, the energy penalty costs could be quite high, as shown in Figure 3. And, as replacement power costs increase, the estimated energy penalty costs for dry cooling could begin to approach the value of other elements in the anticipated annual O&M cost. On the other hand, wet cooling systems are expected to incur relatively minor energy penalty costs.

EPA Response

Paragraphs 1. EPA's estimates for peak-summer energy penalties for dry cooling in a variety of climates is presented in Chapter 3 of the Technical Development Document. For a 750-MW combined-cycle plant with dry cooling EPA anticipates peak-summer shortfalls ranging from 18 MW in Seattle to 23 MW in Jacksonville. These values are lower than those presented by the commenter (even after the commenter's value are normalized to the plant-wide basis). EPA notes that the commenter presents no discussion, no supporting data, and no outline of the methodology for the calculation of the study's estimates. Therefore, EPA is unable to explain why the commenter's estimates differ from those developed by EPA. However, EPA provides significant discussion of the methodology and development of its energy penalty estimates in Chapter 3 of the Technical Development Document and response to comments 316bNFR.524.046 and 316bNFR.501.024.

Paragraph 2. EPA agrees with the comment regarding replacement power costs.

Comment ID 316bNFR.368.014

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Organization Utility Water Act Group

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The results of regional and national projections over the next twenty years (2000-2020) for wet and dry cooling system costs are summarized in Tables 7 and 8, respectively. These projections assume that 100% of the new combined-cycle capacity will be constructed with either wet or dry cooling. While this assumption is unlikely, it enables distinct, independent analyses of the economic impacts these two cooling systems may have on the power generation industry.

As in prior base-case cost comparisons, regionally and nationally, the estimated capital and total O&M costs for dry cooling systems exceed those for wet cooling systems by about 140% and 94%, respectively. At $5.0 billion and $11.2 billion, for wet and dry systems, the total U.S. costs are not insignificant. If annualized at a 7% rate for the 20-year study period, the estimated national costs for wet and dry cooling systems at new CC power plants are $0.5 billion/year and over $1 billion/year, respectively.

{see hard copy for figure}
Figure 3 - Energy Penalty Costs as a Function of Replacement Power Costs

{see hard copy for table}
Table 7
Summary of Projected Costs for Wet Cooling Systems (2000-2020)

Table 8
Summary of Projected Costs for Dry Cooling Systems (2000-2020)

EPA Response

Paragraphs 1&2. EPA reiterates that the national cost estimates presented by the commenter are overestimated. See responses to comments 316bNFR.368.006, 316bNFR.368.007, 316bNFR.368.008, 316bNFR.368.009, and 316bNFR.368.011. EPA also notes, as outlined in responses to comments 316bNFR.368.006, 316bNFR.368.007, 316bNFR.368.008, 316bNFR.368.009, and 316bNFR.368.011, the commenter's "base-case" assumptions are inappropriate, and the inclusion of the condenser/conduit system costs appreciably inflate the capital costs of the wet towers presented.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Robert S. Kripowicz

On Behalf Of:

U.S. Dept. of Energy

Author ID Number:

316bNFR.501

Comment ID 316bNFR.501.001

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Tailor the regulations to focus on the potential adverse environmental impacts.

The regulations should be directed at only those facilities that are most likely to cause an "adverse environmental impact" (AEI). Numerous facilities withdraw water from surface water bodies and use some or all of that water for cooling purposes. We recommend that EPA adopt an approach under which intakes that withdraw small volumes or that use less than half of the intake water for cooling purposes be exempted from the rule or at least subjected to a much less stringent level of controls.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

New facilities with withdrawals that are at or below a two MGD threshold are not subject to the requirements of this national rule. Rather, such facilities are addressed on a case-by-case basis using BPJ. In addition, the Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

Comment ID 316bNFR.501.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Intakes at offshore oil and gas operations that withdraw volumes of water far less than most power generating facilities and that are located miles away from spawning or nursery areas should be exempted or subjected to minimal requirements.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.501.003

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Define and assess adverse environmental impact.

The regulations should focus on what actions must be taken to determine whether the intake is causing an adverse environmental impact and to mitigate those impacts when they are observed. We feel the Clean Water Act and the Nation would be better served by determining the presence or absence of AEI instead of imposing stringent, rigid, technology-based requirements across the board. Further, we do not believe that AEI means the same thing as "adverse impingement and entrainment impacts." Decision makers should consider all types of adverse environmental impacts, including those involving other media (e.g., air emissions, noise, water usage) when assessing AEI.

EPA Response

EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.). Thus, although EPA agrees that all of the potential types of adverse environmental impact fall within the definition of adverse environmental impact, EPA does not believe that impingement and entrainment should be excluded from the definition of adverse environmental impact. EPA's record documents the amount of impingement and entrainment that may occur if not controlled by providing some historical facility examples and documents the effects of this impingement and entrainment where such information is available (see Section III of the preamble to the final rule and Chapter 11 of the EEA). EPA believes that, especially for the new facility rule, measuring environmental performance in terms of reduction of impingement and entrainment is appropriate because measuring impingement and entrainment is quicker and has a higher degree of certainty than conducting population or ecosystem studies.

As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is

a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems, to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

Finally, EPA agrees that it is appropriate to evaluate non-aquatic impacts related to cooling water intakes including noise, air emissions, introductions of non-native species, and fossil fuel consumption. EPA examined each of these issues and determined that when the requirements of Track I are met, these impacts are not unacceptable. Further, many of these non-aquatic impacts are site specific in nature and can be resolved through the two-track framework provided in today's rule. Specifically in the case of the potential for increased air emissions associated with installation of wet cooling towers, EPA estimated negligible annual emissions nationally. Generally, EPA believes that there are environmental laws and regulations in place to address non-aquatic environmental impacts; however, the majority of environmental impacts associated with intake structures are aquatic in nature (see preamble section VI.B.2.e. for additional discussion and the response provided for comment 316bNFR.068.100).

Comment ID 316bNFR.501.004

Subject Matter Code 10.16

Two Track Process

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Organization U.S. Dept. of Energy

Provide options to affected stakeholders.

We prefer regulatory approaches that provide flexibility to regulated entities. We support in principle the two-track approach discussed by EPA in the NODA and attributed to the Utility Water Act Group, an industry trade association. This would allow regulated entities to agree to a set of rigid controls in exchange for a high degree of certainty of getting 316(b) approval or allow them the option of demonstrating that their intakes are not causing AEI (albeit at a greater risk of not getting approval) leading to a less stringent set of requirements. We offer more detailed comments below on how such an approach should and should not be crafted.

EPA Response

For discussions on the basis of today's rule, see preamble section V. For discussions on why EPA did not adopt the industry's two track approach in full, see preamble section V.D of today's final rule.

Comment ID 316bNFR.501.005

Subject Matter Code	2.1
Clean Water Act Requirements	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Maintain States' authority to make decisions.

A fundamental principle of the Clean Water Act is that management of water resources is primarily the responsibility of State and local governments. It follows that the appropriate Federal role in establishing programs for States is to adopt rules which maximize the States' discretion to manage their own resources. In nearly all regulatory programs, States have clearly expressed their desire to have a greater degree of authority and flexibility with only limited Federal mandates. Yet EPA appears to be considering options that would move toward increased Federal control and limited decision-making authority for the States. DOE supports a regulatory approach under which the Federal Government outlines general guidelines to interpret statutory language and allows States to implement programs with sufficient flexibility to address local and regional interests and concerns.

EPA Response

EPA has established the requirements of this rule for the reasons set forth in the preamble to the rule. EPA notes that a significant number of states support EPA in establishing a technology-based minimum floor, analogous to the technology-based rules EPA establishes for industrial dischargers under sections 301, 304, and 306 of the CWA in order to limit the permitting burden on the states at least in the context of new facilities who the record demonstrates are technically and economically able to meet these requirements. See 2-034A and 2-035B in the Docket. EPA notes that the majority of states that have commented on the rule favor EPA establishing a national minimum technology requirement that simplifies the permitting burden for new facilities. EPA also believes that Track 2 affords sufficient flexibility if another technology suite reduces impingement mortality and entrainment to reductions comparable to those achieved by meeting Track 1 requirements. Finally, as always, and as is consistent with section 510 of the CWA, states may always be more stringent than these national minimum requirements.

Comment ID 316bNFR.501.006

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Regulatory Thresholds (page 28854).

EPA included two separate criteria in its August 2000 proposal to determine which facilities would be under the purview of this rule. The first criteria specified that only water intakes less than 2 million gallons per day (MGD) would be exempted. This threshold would have the undesirable affect of requiring additional controls at some of the best controlled facilities in the Nation. The NODA states that at an intake flow threshold of 25 MGD, 50 percent of the utilities built in the last 10 years would still be covered under the rule. The vast majority of all utility units built in the last decade use closed-cycle cooling, which many consider to be a state-of-the-art response to prevention of environmental impacts from intake structures. However, even these well-controlled systems have intakes exceeding 2 MGD, due to make-up water needed to replace normal blowdown streams. We recommend that the threshold be set at a high enough level to exclude such well-controlled units from further regulation. Alternatively, EPA could consider exempting the closed-cycle cooling systems' make-up water from this MGD threshold.

EPA Response

EPA agrees that very large facilities that use closed cooling water systems may still require withdrawals of more than two (2) MGD. However, EPA does not agree that it is unfair to subject these facilities to further requirements necessary to reduce impingement and entrainment. Section 316(b) requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. While reductions in total intake flow may represent the single most significant improvement for new facilities with cooling water intake structures, large flows withdrawn for make-up (i.e., to replace evaporative loss and blow down) can still cause significant impingement and entrainment. Additional controls on intake velocity, flow relative to the source waterbody, and design and construction technologies proposed by the facility also represent important aspects of a cooling water intake structure that must, under section 316(b), be addressed. As discussed elsewhere in this preamble and in the Technical Development Document and Economic Analysis, these additional measures are both widely employed and affordable. EPA does not believe that a determination of "best technology available for minimizing adverse environmental impact" for new facilities can omit these low-cost, effective technologies. Also see Section VIII of the rule for a discussion that explains the percentage of new facilities already meeting the final rule requirements and the low cost of these requirements.

Comment ID 316bNFR.501.007

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

EPA notes that it is considering the intake threshold used in the State of Maryland regulations. These regulations exclude cooling water intake structures withdrawing less than 10 MGD if the volume of water is less than 20 percent of the design stream flow for nontidal waters or less than 20 percent of the annual average net flow past the intake which is available for dilution for tidal waters. Our comments on the proposed rule recommended a flow threshold of no less than 25 MGD, and we continue to support this as a minimum threshold. However, if EPA does not select a threshold of 25 MGD or higher, we would prefer a threshold that is based on the Maryland model, to a threshold of 2 MGD.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis.

For further discussion of these points, see section VI.A.3 of the rule.

Comment ID 316bNFR.501.008

Author Name Robert S. Kripowicz

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Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

The second threshold criterion involves the percentage of the withdrawn water that is actually used for cooling. The August 2000 proposal included a threshold of 25 percent. DOE's comments recommended that the threshold should be established at a level no less that 50 percent, and that remains our recommendation.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.501.009

Subject Matter Code MISC

Miscellaneous Comment

Author Name Robert S. Kripowicz

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Offshore Oil and Gas Facilities (page 28856).

DOE previously commented that EPA had not adequately characterized cooling water use by the offshore oil and gas industry. The Agency has since collected new information on cooling water use and cooling system design and operation at these offshore facilities. We have reviewed much of the information placed in the Water Docket that relates to cooling water use at offshore facilities. The evidence is compelling that many offshore facilities and operations would exceed the 2 MGD flow threshold included in the proposed rule but would have great difficulty in meeting the maximum flow velocity requirements as well as some of the other proposed requirements. The open ocean environment in which most drilling operations occur are not likely to be consequential spawning or nursery areas. Given the relatively low volumes of cooling water withdrawn by offshore facilities and the vast quantities of ocean water in the areas where such facilities are located, it is highly unlikely that offshore facilities could have any significant intake impacts on aquatic resources. Nevertheless, offshore operations are already subject to several additional tiers of reviews compared to shore-based facilities. First, the Minerals Management Service reviews environmental conditions before drilling can begin in new areas. Second, offshore discharges are subject to EPA's ocean discharge regulations (40 CFR 125, Subpart M). Through that review process, EPA could determine if a facility was likely to adversely impact the environment, and the Agency could then take appropriate action. In short, the likelihood of offshore facilities creating an AEI appears low; there are programs in place to identify if such an impact would occur, and to address them; and yet the proposed rule imposes a new layer of regulatory procedures on these facilities.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.501.010

Subject Matter Code MISC

Miscellaneous Comment

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We also highlight two of the recommendations from Chapter 5 of the recently released National Energy Policy. First, it is recommended that the President direct the Secretaries of Commerce and Interior to re-examine the current Federal legal and policy regimes to determine if changes are needed regarding energy-related activities and the siting of energy facilities in the coastal zone and on the Outer Continental Shelf. Second, the plan recommends that the President direct the Secretary of the Interior to continue Outer Continental Shelf oil and gas leasing and approval of exploration and development plans on predictable schedules. Both of these recommendations point out the emphasis that the Administration is placing on predictable and reasonable regulatory and permitting requirements for offshore oil and gas operations. The demand for offshore drilling rigs exceeds their limited supply. Any disruption impacting the scheduling of these rigs (e.g. downtime needed for retrofitting) will adversely affect the availability of oil and natural gas to the consumer. DOE believes that exempting offshore oil and gas operations from the cooling water intake rules or at least providing a less stringent set of requirements for such facilities would be in the spirit of these recommendations. DOE supports EPA's suggestion in the NODA that a higher regulatory threshold of 25 or 50 MGD be used for these facilities.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.501.011

Subject Matter Code 10.03

Additional Littoral Zone Requirements

Author Name Robert S. Kripowicz

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Littoral Zone (page 28857).

In our earlier comments, DOE objected to the term "littoral zone" as the basis for subdividing water body types. We still think it is unnecessary to employ terms that are difficult to define and, in some cases for which the boundaries will shift during daily or seasonal cycles. EPA suggests that it may replace the term "littoral zone" with a new term such as "area of high impact" or "productivity zone". While these terms are preferable to "littoral zone," EPA needs to delineate them. Absent a detailed definition for these terms that is defensible and clearly delineated, DOE cannot support their use.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.501.012

Author Name Robert S. Kripowicz

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Subject Matter Code 11.0

Best Technology Available-Location

EPA suggests that it may define areas of impact on a water body-specific basis. We encourage that philosophy here and in other parts of the regulations. AEI is clearly a site-specific phenomenon and it should be separately evaluated and mitigated on a case-by-case basis.

EPA Response

EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.501.013

Subject Matter Code	10.13
Request for Comment: Uniform Set of Standards Applicable to All Facilities	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Definition of Estuary (page 28858).

EPA suggests a new definition for estuaries that includes a salinity limit of greater than 0.5 parts per thousand (ppt). This definition may be applicable for some estuaries but we believe that it will be difficult to implement in the Chesapeake Bay and its tidal tributaries. As in most estuaries, the salinity of the Chesapeake Bay fluctuates notably throughout the year. The flow pattern of the Chesapeake is driven by fresh water input from the major rivers and salt water incursions from the Atlantic ocean. Winds also play a role in current flow and salinity in the shallow Chesapeake and particularly in some of its tributaries. All of these factors play varying roles at different times of the year. For example, a plant that withdraws cooling water located in the Baltimore Harbor or near Washington, DC on the tidal Potomac may be exposed to water with salinity above 0.5 ppt at one point during the year but below 0.5 ppt at other times of the year. We do not agree with EPA's definition of estuary as it could cause a facility to be placed in more than one subcategory of requirements.

EPA Response

See response to 316bNFR.068.056, 008.010.

Comment ID 316bNFR.501.014

Subject Matter Code 10.011

River/Stream--Proposed Standards

Author Name Robert S. Kripowicz

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Alternate Approach for Freshwater Rivers and Streams (page 28858).

EPA seeks comment on a new regulatory alternative for freshwater rivers and streams that would not mandate flow reduction to a level commensurate with a closed-cycle cooling system for facilities inside of or within 50 meters of a littoral zone. Instead, facilities could implement design and construction measures that would minimize impingement and entrainment of fish, eggs, and larvae and maximize survival of impinged adult and juvenile fish (such as extremely fine-mesh screens, or fish return systems that significantly increase the survival of impinged organisms) in all parts of freshwater rivers and streams rather than only within the littoral zone. DOE supports this type of flexibility. We encourage EPA to offer these sorts of options to facilities located in all water bodies if those facilities can demonstrate that they do not cause an AEI.

EPA Response

While EPA does not agree with using the population or community level of impact in this new facility rule for judging performance that represent best technology available for minimizing adverse environmental impact, EPA has promulgated a final rule that balances the need for permitting new facilities relatively quickly with the need to incorporate some flexibility. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody (i.e., littoral zone). Instead, today's final rule adopts the two-track approach and does not set different requirements for best technology available for minimizing adverse environmental impact for different parts of freshwater rivers and streams. Instead, under Track II an applicant may conduct site-specific studies and perhaps determine that a location away from the shoreline would achieve the same reductions in impingement and entrainment as the Track I requirements would meet at the shoreline at a lower cost. If so, the applicant is free to propose an alternative location for its intake in its permit application as long as the requirements of Section 125.84 are met.

Comment ID 316bNFR.501.015

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Robert S. Kripowicz

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Additional Impingement, Entrainment, and Mortality Data (page 28859).

EPA seeks comments on additional data that supports the premise that power plant cooling water intakes kill or injure large numbers of organisms. This is a broad issue and we offer just a few general thoughts. First, the evidence is indisputable that some power plant intakes impinge or entrain large numbers of organisms. However, in determining AEI it is imperative to assess whether the documented impingements and entrainments injure those organisms. The scientific literature suggests that many species of aquatic animals survive impingement quite well and even some entrained organisms survive. Moreover, even those organisms that die or are critically injured as a result of impingement and entrainment do not necessarily constitute an AEI, because these organisms may provide a food source for other animals. These predators (or scavengers, as the case may be) may not be the same organisms that would have fed on a live organism of that size, but they are still part of the ecosystem. Even if it is assumed that all impinged and entrained organisms are removed from the ecosystem, it is important to assess the loss of those organisms not strictly as a loss, but rather in relationship to the overall population of organisms in the water body and other anthropogenic or natural causes of injury and mortality. The assessment should also consider the ability of the population to compensate for and make up the lost organisms through natural reproductive strategies.

EPA appears to have emphasized the relatively few cases of documented high impingement and entrainment while ignoring the many cases where impingement and entrainment have been shown to be low. As an example, in response to EPA's prior request for impingement and entrainment studies at manufacturing facilities, DOE previously submitted copies of two such studies for Bethlehem Steel's Sparrows Point Plant in Baltimore and for Westvaco Paper's Luke Mill on the Upper Potomac River. Both of these facilities are located in areas that would be considered sensitive under EPA's proposed rule yet neither show unacceptable impingement and entrainment impacts. Not all portions of all estuaries, tidal rivers, and littoral zones are spawning or nursery areas of consequence or are laden with fish that could be impinged. In spite of their value to the public record, we were unable to find any reference to these studies in the NODA, yet they vividly depict minimal impacts from actual facilities.

EPA Response

While EPA agrees that some species do appear to survive entrainment and impingement, it is also clear from multiple studies that many species exhibit high mortality rates in response to impingement and entrainment events. In the case of entrainment and impingement survival studies, survivorship is highly dependent on the species and life history stage affected. As discussed in section VI.B.2.c of the preamble, a summary of entrainment mortality data from five Hudson River power plants indicated that mortality rates can be substantial. With respect to impingement mortality, EPA acknowledges that impingement survival can be high if appropriate technologies are in place. Conversely, impingement survival can be very low seasonally for some species such as bay anchovy and Atlantic

menhaden. Today's rule seeks to minimize impingement and entrainment losses for all affected species.

EPA agrees that life stages killed by entrainment or impingement processes may provide a food source for other organisms. However, EPA acknowledges that oftentimes entrained and impinged organisms are not returned to the waterbody and thus do not serve as a food source for other resident organisms. Further, should the entrained and impinged mortalities be returned to the waterbody, EPA is concerned about the overall effect on energy flow and functional shifts within the waterbody caused by substantially increasing the supply of dead organisms available to localized scavengers and decomposers, resulting in a net loss to consumers at other trophic levels over extended periods of time.

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Finally, EPA added additional facility entrainment and impingement information, particularly for low-flow facilities, in section III of today's preamble. As discussed in section III, the examples provided were meant to illustrate that entrainment and impingement losses in some cases can be substantial. Under Track I of today's rule, there is no distinction among the different waterbody types at which an intake may be sited. Thus, all intakes will be subject to the same technology-based performance standards that seek to minimize entrainment and impingement. Should a facility choose to follow Track II of today's rule, they can show that site-specific conditions and/or applied technologies will allow them to achieve a level of reduction in impingement and entrainment comparable to the same level achieved under Track I. Thus, today's rule provides a flexible option for facilities that do not project high impingement or entrainment losses within their respective waterbodies.

EPA appreciates the opportunity to receive and evaluate additional reports that have bearing on 316(b) issues and offers the following comments. While both reports assert that their cooling water intakes withdraw small numbers of impinged or entrained life stages, EPA questions the relevance of low numbers of losses within waterbodies that were likely degraded at the time the study was conducted. The Sparrows Point facility (located in the upper portion of the Chesapeake Bay) report was prepared in 1979, a period of marked declines in Chesapeake Bay living resources. In the case of a waterbody or waterbody segment that is impaired, living resources often exhibit diminished numbers and diversity. Because water quality standards are designed to maintain and improve the Nation's waters, degraded waterbodies are subject to restoration efforts that will theoretically result in increased numbers of fish and other aquatic resources as the waterbody returns to more historical, pristine conditions. EPA agrees that not all portions of estuaries, tidal rivers, or nearshore coastal waters are spawning or nursery areas or even "laden with fish." However, EPA notes that in many cases, the reason for this lack of productivity is due to anthropogenic activities that impair water quality. EPA does not support the argument that it is appropriate to further impact a waterbody once it has been degraded.

Comment ID 316bNFR.501.016

Author Name Robert S. Kripowicz

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Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

Assessment of Population Modeling Approach (page 28859).

It is DOE's opinion that AEI must be assessed in terms of impacts to populations rather than on the loss of a certain number of individuals. Toward this end, EPA proposes a new definition of AEI: "Adverse environment impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the populations's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, and (2) is attributable to the operation of the cooling water intake structure." Under this approach, EPA would define unacceptable risk using a variety of methods that fisheries scientists have developed for estimating (1) the level of mortality that can be imposed on a fish population without threatening its capacity to provide "maximum sustainable yield," as developed under the Magnuson-Stevens Fishery Conservation and Management Act, on a long-term basis, and (2) the optimum population size for maintaining maximum sustainable yield. DOE supports this approach as being based on good science, with some caveats.

EPA Response

Please see responses to comments 316bNFR.069.008 and 316bNFR.068.037.

Comment ID 316bNFR.501.017

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

DOE recognizes the scientific value of tools such as “maximum sustainable yield”, but urges caution in employing them as rigid, enforceable regulatory limits. These models and concepts are used to estimate the amount of fish biomass that can be harvested over a long period of time without disrupting the fish population’s ability to sustain itself. Although based on good science, the models are predictive and therefore subject to error. EPA has previously suggested such criteria for determining AEI as a 1 percent reduction in fish population size. Given the huge natural fluctuations in fish populations, a criterion of 1 percent reduction could not be confidently measured or predicted, even by maximum sustainable yield models. Although, in general, we favor explicitly measured regulatory criteria, we recommend flexibility if the ability to measure or predict is highly uncertain. Maximum sustainable yield models should be used as one of several tools to help regulators determine whether a cooling water intake is causing AEI, but not with a “bright line” criterion of 1 percent reduction.

EPA Response

Please see response to comment 316bNFR.068.037.

For the purposes of today's rule, EPA has rejected the proposed definition of AEI as the impingement or entrainment of 1 percent or more of the near-field aquatic organisms. Under today's rule, adverse environmental impact includes impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population’s potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.).

Comment ID 316bNFR.501.018

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Other Options for Interpreting AEI (page 28862).

One of the options suggested by EPA is to define AEI as a level of impingement and entrainment that is “recurring and non-trivial”. “Non-trivial” is a vague term, subject to widely differing interpretation. However, EPA proposes to interpret this term as the degree of impingement and entrainment that would have resulted from the use of the traditional technologies in use at the time the Clean Water Act (including § 316(b)) was enacted in 1972. We strongly oppose the idea of generalizing that all 1972 technology was insufficient to avoid AEI. In fact, the location of an intake and the nature of the fisheries in a body of water are far more important in determining whether an intake causes AEI than is the choice of technology. Admittedly, if there are numerous adult and early life stage organisms present in the vicinity of an intake, then bar racks and fixed screens will not be very protective. But not all power plants used only that basic level of protection in 1972 and not all were located in areas where fish were likely to be at risk.

EPA Response

Please see response to comment 316bNFR.040.003 for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.501.019

Subject Matter Code 9.4

Adverse Environmental Impact

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Organization U.S. Dept. of Energy

EPA states in this section that the 316(b) language "best technology available to minimize adverse environmental impact" can be interpreted in a way that focuses on technology rather than impact. We disagree and believe that EPA must identify the AEI first and then determine if best technology available is really needed at any given location. DOE and Argonne National Laboratory are examining this issue of what constitutes an AEI in detail, and will provide further recommendations to EPA when they are available.

EPA Response

See responses to comments 316bNFR.068.007, 316bNFR.068.009, 316bNFR.068.032 (legal interpretation), 316bNFR.501.003 (AEI), and section VI.B.2.a of the preamble to the final rule.

Burden on States (page 28865).

The NODA indicated that four of the five States that commented on this issue supported minimum national technology requirements rather than using a site-by-site evaluation process. The basis for this is presumably one of lack of resources at State agencies to engage in a detailed lengthy review of site-specific evaluations. While this may be a legitimate concern for some States, the principle appears to be counter to Administrator Whitman's goal to provide increased flexibility to the States to develop their own regulations with limited Federal guidance. Many States have sought the authority to make decisions on their own without the Federal Government being overly prescriptive regarding how Federal goals were to be achieved. We understand that EPA is responding to the comments it has received, but we think that most States would dislike the removal of the regulatory flexibility that they have by a national rule. As a first step, we suggest that EPA might poll a larger number of State water pollution control agencies to get a better national perspective.

Moreover, we find expediency to be a poor basis for establishing costly regulatory programs. If 316(b) is an important enough issue for EPA to agree to revisit it in the late 1990's after 20 years of successful State regulatory activity and then devote years of effort to develop regulations, then it seems that regulatory agencies should be expected to devote serious attention to implementation of the program.

We are aware that many years ago the State of Maryland imposed a small surcharge on all electric bills. That revenue was devoted to support power plant siting and review activities. Maryland has had one of the most active 316(a) and (b) programs in the country, aided in part by this additional source of revenue. Other States that are concerned about inadequate resources to review site-specific 316(b) studies might consider a similar funding approach.

EPA Response

EPA believes that the final rule provides State permitting authorities with a consistent, well-defined national framework upon which to base permitting decisions related to cooling water intake structures, thereby streamlining the permitting process while retaining a high degree of flexibility and site-specificity. The two-track approach allows permittees to consider site-specific conditions in selecting a permitting track and implementing appropriate technologies. All aspects of permitting are subject to review and approval by the permitting authority. Specifically, States are expected to review information provided in permit applications, and make determinations as to the appropriateness of the planned design and construction technologies, and (for Track II) Comprehensive Demonstration Study methodologies and results. State permitting authorities will also verify that facilities meet the appropriate proportional flow requirements. States will have the authority to include additional or alternative requirements in reissued permits to account for site-specific issues. Furthermore, the final rule applies to a specific universe of facilities that meet the established intake flow and cooling water

use thresholds. Any new facility that has or requires an NPDES permit but does not meet the applicability thresholds established in the final rule will continue to be subject to permit conditions established by the permit director on a case-by-case basis using best professional judgment. Sections VII.C and VII.F of the preamble to the final rule describe the role of the permitting authority in more detail.

In response to the commenter's suggestion that EPA poll additional State agencies to get a better national perspective, EPA believes that it has conducted sufficient outreach activities to satisfy the requirements of section 6 (Consultation) of Executive Order 13132, which concerns Federalism, even though this section does not apply to this rulemaking. In developing the rule, EPA conducted several outreach activities through which State and local officials were informed about the proposed rule and they provided information and comments to the Agency. EPA met with the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). With ASIWPCA's assistance, EPA conducted a conference call in which representatives from 17 States or interstate organizations participated. EPA also held two public meetings to discuss issues related to the rulemaking effort. Representatives from New York and Maryland attended the meetings and provided input to the Agency. EPA also contacted Pennsylvania and Virginia to exchange information. In addition, EPA Regions 1, 3, 4, and 9 served as conduits for transmittal of section 316(b) information between the Agency and several States. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials. Additionally, EPA met with industry, environmental, and State and Federal government representatives to discuss regulatory alternatives for the new facility proposal. A summary of the concerns raised during consultation and EPA's response to those concerns is provided in the record of the final rule.

EPA agrees that 316(b) is an important issue and the Agency does expect States to devote serious attention to implementing the program. While the Agency believes that the establishment of a consistent, well-defined national framework will expedite the permitting process, EPA contends that expediency is not the basis for establishing the rule. The final rule is intended to provide a national framework within which States may make more consistent decisions about technology requirements associated with cooling water intake structures, while retaining flexibility for those facilities that wish to demonstrate appropriate site-specific, alternative technologies for minimizing adverse environmental impacts.

Comment ID 316bNFR.501.021

Subject Matter Code 10.01

Regulatory Framework Options

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Organization U.S. Dept. of Energy

Recently Constructed Facilities Already Implementing the Proposed New Facility Requirements (page 28865).

EPA provides statistics on the percentage of facilities built in the past 15 years that are already reportedly complying with: a) design and construction requirements, b) reduced flow volume restrictions, and c) the requirements in cases a and b plus the proposed rule's velocity requirements. According to this analysis, 44 percent of the utilities constructed in the last 15 years meet all three requirements outlined in case c. However, this information should have little bearing on the new requirements. Just because 44 percent of relatively new utilities meet a certain set of requirements should not be the basis of setting new requirements for all new power plants. The new requirements should be set to reflect good science and policy. There is no way to determine why those 44 percent of plants ended up with all three sets of requirements. It could have been a State-imposed directive, or a decision by the utility to add certain features for business reasons, or some other reason. In fact, it may be more educational for EPA to examine what types of requirements the other 56 percent of recent utilities used and why they ended up with those requirements rather than employing all three sets of requirements.

EPA Response

EPA is not looking at existing facilities but is concentrating on data available in the NewGen database for new facilities. EPA also examined the characteristics of existing facilities as reported in the detailed questionnaire. Available information shows that 74 of 83 proposed new facilities are already planning to use closed-cycle recirculating cooling water systems. See the Economic Analysis for the final rule.

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Organization U.S. Dept. of Energy

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Energy Consumption Associated With Alternative Cooling Systems (page 28866).

EPA seeks information about the energy penalties associated with switching from once-through cooling systems to wet or dry cooling towers. DOE, through its National Energy Technology Laboratory and Argonne National Laboratory, is currently modeling energy penalties from a series of hypothetical coal-fired power plants in different parts of the country. We hope to have a draft report ready by the end of June to provide to EPA.

EPA Response

EPA appreciates the efforts and resources of the Department of Energy in providing EPA with a draft report on modeled, peak-summer energy penalties for retrofitted cooling systems at coal-fired existing power plants. The draft report was provided to EPA as a deliberative document and, therefore, cannot be entered into the record of this rule. However, EPA notes that the preliminary conclusions about peak-summer shortfalls reached in the draft DOE study generally agree with the estimates of EPA in the Chapter 3 of the Technical Development Document. Even though the retrofitting influence cannot be entirely separated out of the DOE energy-penalty estimates, EPA notes that the estimates presented by DOE in the draft report generally coincide with EPA's coal-fired power plant energy penalty estimates for new facilities.

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Organization U.S. Dept. of Energy

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA states that it intends to estimate energy penalties by predicting the type of cooling systems that new facilities would be likely to install absent final regulations. EPA does not provide details on how it will make these predictions. In the August 2000 proposal, EPA assumed that there would be little or no cost to the industry of employing closed cycle cooling at all new facilities because all or nearly all new facilities would already choose closed-cycle cooling for reasons unrelated to 316(b). Many comments were submitted to EPA during the comment period indicating that this assumption was not accurate. We recommend that EPA not make a similar assumption in its ongoing analysis.

EPA Response

EPA's conducted exhaustive data collection efforts for the final rule, in order to establish accurate projections of the number of new facilities and types of baseline cooling systems employed at these plants. EPA received significant, numerous, and well-reasoned comments on the subject of the number of facilities within the scope of the rule and the types of cooling systems that would be installed at these systems in absence of the rule. In addition, EPA provided the public and all stakeholders with a notice of data availability (to which this comment responds) with a primary object of receiving comment and critique on EPA's methodology and estimates of the number of new facilities within the scope of the rule and their baseline facility characteristics (such as the type of cooling system to be installed). Therefore, EPA is confident that its estimates are accurate for nine power plants and 29 manufacturing facilities to install once-through cooling in the absence of this rule. The related projection that 83 facilities within the scope of the rule will install recirculating closed-cycle cooling systems (or, for the case of manufacturers, recycle and/or reuse cooling water) is equally well researched and valid. See responses to comments the Economic Analysis for a thorough discussion of EPA's new facility data collection efforts and the final estimates of new facilities (and their projected characteristics).

EPA notes that the final estimate of total annual cost to the industry for this rule is $47.7 million. EPA considers these costs to be economically practicable on a national and facility basis. However, EPA would never, and has not, stated that there "would be little or no cost to the industry" as a result of this rule.

Comment ID 316bNFR.501.024

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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EPA commissioned Science Applications International Corporation (SAIC) to assess energy penalties. In an April 20, 2001 draft report "Steam Plant Energy Penalty Evaluation," SAIC estimates energy penalties. The technique used to estimate the energy penalty associated with higher condenser temperature in recirculating cooling systems is an approach based on historical correlations but for most plants and locations it is approximately correct. Since the correlation is based on the inlet cooling water, but the actual steam pressure and efficiency are related to the exit cooling water temperature, this technique could appreciably underestimate the energy penalty for a plant currently using once through cooling with a small water temperature range.

In Table 6 of the SAIC report, the energy penalty is expressed on a percentage basis. This figure is actually a decrease in net plant efficiency and not the energy penalty. For example, since the efficiency of a subcritical fossil unit is in the range of 37 percent, a reduction in efficiency of 1 percent (i.e., to 36 percent) would result in a 2.7 percent reduction in plant output or conversely an increase in fuel requirements for an equivalent amount of power of 2.7 percent. The wet tower fan energy requirement in Table 7 is given in terms of percent of power output as is the water pumping loss in Table 9a. The overall energy penalty should be calculated as the total of the energy penalty for steam condensation, energy for fans and energy of water pumping. Therefore, to convert one of SAIC's net plant efficiency losses (which they are incorrectly labeling the energy penalty) to an actual energy penalty you would have to take, for example, Boston's net efficiency loss of 0.7 percent (Table 6) and divide by 37 percent and add the wet tower plant fan energy requirement from Table 7 and the pumping power requirement from Table 9a which would result in an energy penalty of 2.4 percent not 0.7 percent. This paper would be much more useful and comparable to other literature values for energy penalties if all of the SAIC-calculated penalties were presented in uniform units. We believe that the most appropriate unit for the penalty is "the percentage of plant output" or phrased differently, "the percentage of additional energy that would have to be used to generate the same amount of electricity."

EPA Response

This is a combined response to comments 316bNFR.501.024, 316bNFR.524.046, and 316bNFR.524.301 (note that the latter comment, made by the Utility Water Act Group (UWAG) contains detailed technical comments from Appendix B (to their notice of data availability comments), which EPA responds to directly herein.

The following is an evaluation of public comments received from the Department of Energy (DOE) and UWAG concerning EPA's energy penalty estimates and the methodology presented in the draft report, titled "Steam Plant Energy Penalty Evaluation, April 20, 2001," which was included in the public record for the notice of data availability.

The DOE comments were the more general of the comments in nature. The Agency addresses these

comments first, along with general comments made by UWAG on energy consumption for different cooling systems. The UWAG technical comments (Appendix B of their comments) on the draft energy penalty report are then addressed, followed by a brief discussion of other issues related to EPA's notice of data availability draft report (here after referred to as the "draft report"). Finally, EPA provides conclusions on the comments and their influence on the final energy penalty estimates.

General Comments from DOE and UWAG

The Components of Energy Penalties

Both the Agency and the commenters agree that the total energy penalty consists of three components: 1) changes in turbine efficiency, 2) changes in cooling water pumping requirements, and 3) changes in cooling system fan energy requirements. The commenters make no references to other significant components, implying that no other additional factors need to be considered.

In the draft report, the Agency estimated the three components and presented them separately to allow flexibility in application and to avoid double counting. For example, the fan and pumping energy costs were incorporated into the Agency estimates for the cooling tower O&M costs. Therefore, the notice of data availability presented each component separately and factored them in separately, where necessary, depending on the analysis being performed. However, from an energy output perspective (i.e., ignoring costs), the DOE comment is correct that for the total energy penalty, all three components should be added together. The Agency intended to do this all along.

Turbine Efficiency and the Presentation of Energy Penalty

The Agency agrees with DOE that the energy penalty should be expressed as a "percentage reduction in plant output." Again, the Agency had intended to do so and, as noted by DOE, presented the pumping and fan power components as such in the draft report. While the Agency intended for the calculated values for changes in turbine efficiency to be representative of percent changes in plant output, the calculation method, as presented by the Agency, unfortunately led to other interpretations. Therefore, for the sake of clarity, the Agency developed a revised method for determining the changes in turbine efficiency, now based on turbine exhaust pressure response curves, for the final rule. This method removes the confusion cited above but does not change results dramatically.

Energy Penalties for Dry Cooling Towers and the Basis of Comparison

The draft report only addressed the energy penalty for once-through versus recirculating wet cooling towers. Subsequent to the draft report, the Agency developed energy penalty estimates for dry towers (air cooled condensers) for comparison to either once-through or wet tower cooling baseline systems. These estimates are presented in Chapter 3 of the Technical Development Document. The estimates in the draft report were for alternative cooling systems to be installed at new facilities (in other words, they represented a change in design from once-through to wet tower cooling systems). As such, the Agency did not consider factors that would be associated with retrofitting an existing facility, contrary to the commenter's assertion.

Condenser Inlet Temperature

Both the UWAG and DOE comments noted that the Agency only considered the condenser inlet temperature. The commenters correctly point out that condenser inlet temperature is not the only factor that will affect the turbine exhaust pressure. However, in the Agency's view, it is the major driving factor. While condenser inlet temperature is the starting point, temperature rise (or "range") through the condenser and the design of the condenser will influence the exhaust steam pressure. The Agency chose cooling system design parameters that best represent the wide range of systems recently constructed. These same design parameters are used as the basis for the compliance cost estimates for installing recirculating wet towers. The representativeness of these numbers will be discussed in more detail below. The trade-off is that plants with smaller temperature rises must accomplish the cooling by using a larger volume of cooling water flow. UWAG only notes that the method neglects the influence of condenser performance (Comment 2).

Detailed Technical Comments from UWAG

Turbine Exhaust Pressure, Performance, and Loading

In the Agency's view, UWAG is correct in noting that the exhaust pressure at which condensed moisture may cause damage to the turbine will vary depending upon throttle conditions, the shape of the expansion curve, and blade metallurgy. If the throttle settings are low (that is, the plant is operating much below capacity), then the exhaust pressure at which damaging moisture levels may occur will be lower. Agency evaluation of energy penalty focused primarily on turbines operating close to their capacity, which is supported by the results of the Agency's data collection efforts for the final new facility rule. For instance, the Agency projects that the mean capacity factor at new plants is approximately 85 percent (that is, near to full capacity). See the Economic Analysis.

Condensed moisture is but one of several factors that may prevent more efficient operation at lower exhaust pressures. Another more important factor is the dynamic losses mentioned in UWAG Technical Comment 2. As can be seen in the turbine response graph showing turbine exhaust pressure versus turbine heat rate (included as Attachment B to the draft report), the curve representing the maximum steam loading rates straightens and begins to increase (that is, the efficiency decreases) as the pressure drops below approximately 1.5 inches Hg. This efficiency decrease is, for the most part, due to dynamic exhaust losses which occur when the expansion of steam (due to steam pressure progressively dropping through the turbine) results in an increase in the velocity of the steam as it exits the turbine.

In general, manufacturers design steam turbines to prevent a steam velocity increase by increasing the turbine cross-sectional area as the steam passes through the turbine. However, as the exhaust pressure approaches a vacuum, the amount of area required at the outlet end increases rapidly and the corresponding cross-sectional area needed increases the turbine costs such that the economic trade-off (increased cost vs. increased efficiency) compels the designer to lose efficiency at low exhaust pressures. For standard turbines at low exhaust pressures, the steam velocity increases and a portion of the steam energy is converted to kinetic energy (proportional to the square of the velocity). This increase in the steam kinetic energy reduces the net amount of energy available to the turbine. Thus, the commenters are correct: rather than condensed moisture, it is dynamic exhaust losses that set a practical minimum exhaust pressure (at higher steam loading rates) for turbines of conventional design.

The Agency bases the final energy penalty estimates on actual turbine response curves representing the different types of plants, rather than on theoretical calculations. The Agency developed two sets of values representing maximum load and 67 percent load (that is, 67 percent of maximum steam load). Finally, the Agency bases its estimates for reduced capacity at peak demand periods on the maximum load values and the estimate of mean annual energy penalty (for the purpose of estimating economic impact over the entire year) based on the 67 percent load values. In the Agency's view, the nuclear penalty estimate based on the theoretical calculations is validated by the turbine response curve for that facility. A comparison of this curve with the estimated penalty curve (based on theoretical calculations) showed that the two curves were very close in value. In these estimates, the Agency used the data from Attachment B to these comments (the turbine response curve) for the nuclear power plant penalty estimates.

Optimal Turbine Back Pressures

UWAG argues that the use of 1.5 inches Hg as the optimal operating back pressure does not consider that many U.S. plants operate below 1.5 inches Hg during substantial portions of the year. It then states that this assumption is not likely to have a huge effect on the penalty (although it will tend to understate the penalty). As discussed above, the 1.5 inches Hg value corresponds to turbines operating near capacity. Rather than assume that plants will optimize the operation of the cooling system, the turbine efficiency analysis in the Agency’s final energy penalty study uses the values from the turbine response curves. Therefore, the Agency avoided setting any minimum exhaust pressure value, about which the commenter expresses concern.

The Agency agrees with the point raised that some U.S. plants operate below 1.5 inches Hg for substantial portions of the year. In some cases, the design of the plant does not provide for control of the cooling system (for example, a once-through system with constant speed pumps). However, unless the plant is specifically designed to operate efficiently at low pressures (with higher turbine capital costs), the turbine response curves indicate that typical turbines operating at low exhaust pressures either operate efficiently but at well below the turbine capacity, or operate in a less than optimal mode near full capacity. In fact, the curves suggest that turbines of standard design operating at exhaust pressures below 1.5 inches Hg and near capacity may be experiencing an energy penalty by not controlling the cooling system such that the exhaust pressure does not drop below the optimum pressure. Turbines operating at low load experience improved efficiency at lower exhaust pressures, but the diminished output tempers the overall effect. Therefore, the Agency’s methodology does not underestimate energy penalties as the commenters suggest.

Empirical Data Versus Subtle Effects

The Agency agrees that the estimation methodology simplifies complex relationships including subtle impacts of turbine design. The use of empirical data simplifies the modeling of complex factors with subtle effects. This is the fundamental approach of design engineering and is a reasonable approach for this rule.

The commenter takes exception to the Agency’s perceived reliance on a cooling tower manufacturer for comparison of its estimates. The Agency used data in Attachment C of the draft report (to which

the commenter questions) only as a benchmark value for comparison/validation. Since the Agency's estimates were derived independently (as explained in Chapter 3 of the Technical Development Document), the qualifications as a cooling tower manufacturer do not affect their validity.

Thermal Design Approach Values

The Agency disagrees that there is a disadvantage with using the median value (it is also the mean and the mode, in this case) for the design approach of the model cooling tower used for the regulatory impact analysis. The data in Attachment G of the draft report represents 45 wet cooling towers installed from 1997 through 2000 in locations throughout the country. The Agency reviewed this data and did not discern any pattern, such as regional trends, that would warrant use of values different than the statistical median. The Agency intended for these estimates to support national estimates. Therefore, the Agency included regional and seasonal differences in the cooling media (surface water, wet bulb, dry bulb) temperatures in the estimates for the final rule. Similar to other construction projects, economic considerations, such as availability of capital and the desired time period to recoup investment, among other factors, influence the selection of the design approach, design range, and other design parameters. The Agency believes it is difficult to estimate these factors and variables and notes that the commenter did not suggest a reasonable way to take these variables into consideration in the national energy penalty estimates. In the Agency's view, the statistical median for recently constructed cooling towers throughout the country best represents the full range of design operating conditions employed throughout the country. In addition, the commenters do not take issue with the validity or representativeness of the data in Attachment G to the draft report. See also Chapter 3 of the Technical Development Document for the data supporting the Agency's estimates of a design approach value of 10 deg F.

The Agency notes that the design approach value is for comparison to ambient wet bulb conditions and not to the wet bulb temperature of the tower inlet, which can be slightly higher when air recirculation occurs. The Agency also notes that air recirculation occurs intermittently and only at times when winds are high and are blowing from a direction perpendicular (broadside) to the tower orientation. Where possible, towers, in their design, are oriented so as to minimize this effect. In general, the installed tower is certified by the manufacturer to perform within the design specifications with a wind velocity of up to 10 mph (Hensley 1985) . Thus, the tower size and other design criteria that apply to the towers used in the cost estimates do include consideration of air recirculation.

The commenters take issue with the use of a constant approach value throughout the year. The approach value that the Agency used for the draft report represents design conditions which generally apply to the worst-case design (i.e., summer) conditions. As such, the use of a constant value throughout the year will not result in inaccurate estimates for the maximum penalty value. After further review of this issue, the Agency agreed that the commenters are correct that it is inappropriate to use the design approach value for estimating the average energy penalty throughout the year. EPA has found within the suggested reference (Hensley 1985) a graph for the relation between wet bulb temperature and cold water temperature for a tower that can be used as the basis for estimating the approach at wet bulb temperatures other than the design temperature. The revised penalty estimates in the final report incorporate this suggestion for estimating seasonal changes in the approach values.

Turbine Exhaust Pressure and Cooling Water Inlet Temperatures

For the final energy penalty report, the Agency investigated whether the Heat Exchange Institute Standards for Steam Surface Condensers assist in more "precisely" estimating the relationship between turbine exhaust pressure and cooling water inlet temperatures. The Agency notes that a revised method would in itself require assumed values (for example, condenser heat transfer coefficient, number and arrangement of tubes, etc.) that given the nature of the comments are then subject to the same arguments made by the commenter that they do not represent the full variety of condenser designs being employed. In the end, the revised method suggested by the commenter generated very similar results to EPA's method in the draft report, and, therefore, was not used.

Fan Energy Requirements

UWAG implicitly agrees with the EPA methodology for estimating wet cooling tower fan energy requirements. The commenters only take issue with using an "optimistic" motor efficiency of 95 percent instead of 92 percent, and failure to include a factor for fan gear efficiency (typically 96 percent). The factors used in the draft report, including a fan usage factor of 93 percent, were obtained from a cooling tower manufacturer (Fleming 2001). Incorporation of the UWAG suggestions increased the fan energy component by a total of 7.6 percent of a component that itself is less than 1 percent of plant output. Regardless, the Agency incorporated the factors suggested by the commenter.

Recirculating Water Pumping Velocity

UWAG's comments dispute the use of a cooling water velocity of 5.7 ft/s in the circulating water pipes, reporting that their past observation was that cooling water velocities in all three types of power plants were in the range of 8 to 11 ft/s. EPA notes that the 5.7 ft/s value was used as the minimum design starting point. The draft report showed that the results of piping designs resulting in three different flow velocities of 5.8, 7.7, and 11.6 ft/s, along with three different piping distances, were used in the analysis.

As a follow-up, the Agency contacted a Bechtel power systems engineer to obtain typical values for pumping head and learned that a 50 ft total pumping head was typical for a once-through system (Taylor 2001). The notice of data availability analysis shows that for a pumping distance of 1,000 ft, the total calculated pumping heads were 49 ft and 58 ft at pipes sized to produce velocities of 7.7 and 11.6 ft/s, respectively. These values compare favorably with the Bechtel estimate. Final Agency estimates for once-through pumping costs use this 50 ft pumping head value.

Static Head

UWAG states that the two static head values assumed by the Agency are inaccurate based upon reference to Power Engineering sources. The commenters did not specify in what way the values used by the Agency were inaccurate except to imply (as indicated in comment 10 below) that they may be overstated. The Agency reviewed the cited reference (Handbook of Energy Systems Engineering) to see if useful data was available for inclusion in the final analysis. As such, the implication made by commenters, as elsewhere, is that Agency's draft report estimates would tend to understate the penalty.

After review of the data, the Agency determined that it disagrees with the assertion made by the commenter regarding understated static head values. The Agency estimates that the siphon will continue from pump inlet to an open channel outlet, and, as a consequence, the static head would be the elevation difference between these two. In many cases this static head difference would be relatively small. Thus, the Agency's estimates of static head in the notice of data availability are reasonable. The Agency also notes that the static head is a site-specific value.

Gravity Versus Siphon Flow of Cooling Water

The commenters contest the Agency's estimate that cooling water will flow by gravity back to the source. The Agency was aware of the use of the siphon effect (with vacuum pumps at the high point) in condenser piping, but was not certain of its wide-spread use and therefore did not include it in the analysis for the notice of data availability. The estimate was intended to produce a more conservative (i.e., higher) pumping head. In this case, the effect of the estimate for gravity flow was a conservative estimate.

The Agency subsequently obtained information concerning head losses within condensers (Hess 2001). The pumping head component for condenser loss in the final estimates reflects consideration of this data. The addition of condenser losses offset the reduction in static head that results from the siphon effect outlined above. This appears to explain why, despite the comments, that the draft report estimates for total pumping head are similar to the estimate provided by Bechtel (Taylor 2001).

Pumping Head as a Function of Tower Height

UWAG disagrees with the pumping head estimates for cooling towers in the notice of data availability report, citing the Agency's lack of varying the tower height, using a small dynamic head, and neglecting to include losses in the tower spray nozzles. The Agency's based the pumping head calculations on a single cooling water flow value and therefore it is not necessary to consider variations in the tower height. The Agency chose a single tower design and a total pumping head value for an actual tower reported by a tower manufacturer (Fleming 2001) which included all of these pumping head components in combination. The tower chosen is actually sized for a slightly more conservative flow than that used in the calculations. Therefore, the tower design specifications are consistent with the tower design used in other energy penalty components and in the cost analysis.

Plant Operating Capacity

The commenters are correct that at times when the plant is operating near its engineering or regulatory limits, the penalty will effectively reduce capacity. They also point out that the energy penalty is not just an economic concern (that is, the penalty will require use of additional fuel or purchase of replacement power), but can also limit plant capacity during peak demand periods. However, this comment has no bearing on the penalty estimates themselves. The Agency also notes that for wet cooling tower systems, the magnitude of even the peak-summer shortfall penalties do not approach a level that will impact plant capacity at peak demand periods. The commenters make a similar statement in Appendix C of their comments to the notice availability. The same is not true for dry cooling systems, based on the Agency's estimates.

Turbine Efficiency Adjustment Factors

The turbine efficiency estimation methodology used in the final energy penalty analysis eliminates the need to use the 17 percent factor to which the commenters object. However, the Agency's final method continues to estimate that the steam turbine contributes approximately 1/3 of the total plant capacity for a combined-cycle plant. The commenters did not take issue with the 1/3 capacity assumption.

Fan and Pumping Costs

The Agency wishes to clarify the estimated fan and pumping costs, in particular, the use of an electricity cost of $0.08/kWh rather than $0.03-$0.04/kWh. The Agency uses an electricity cost value that represents the average cost to the consumer. This value was chosen as a conservative value (on the high side) to ensure that the estimates compensated for other minor O&M cost components associated with the operation of the cooling fans and pumps that the Agency has not directly included.

Conclusions Regarding Public Comments

The Agency, as described above, fully considered the substance of the comments submitted and has incorporated revisions in its final analysis based on a portion of the arguments, as noted. However, the Agency notes that the commenters generally did not present detailed data to support their positions or that would assist the Agency in revising its estimates. In turn, the Agency sought out additional reference material from a variety of sources, in addition to some references cited by the commenters, to determine the most accurate final estimates possible. These references are included in the record for the final rule.

Many of the comments take issue with the simplification of a very complex system. One of the greatest challenges of this effort for the Agency was to balance the many design and operating variables that apply to a variety of design-specific conditions with the need to develop national estimates that are valid for all of these situations. Thus, where possible, the Agency employed statistical estimates and empirical data to best represent the site-specific conditions and engineering relationships. The Agency points to the DOE comment which states that the draft report methodology "is an approach based on historical correlations, but for most plants and locations it is approximately correct." After incorporation of the revisions outlined above (which the Agency conducted in response to comment and for confirmatory reasons) the Agency's final energy penalty estimates are reasonable and defensible national estimates.

Attachment A-1
Exhaust Pressure Correction Factors
For a 233 kW - 2,400 psig - 1,000 deg F Turbine
(Source: General Electric 1972)
See Attachments to Chapter 2 of the Technical Development Document

Attachment A-2
Exhaust Pressure Correction Factors
For a Combined Cycle Turbine

(Source: Litton)
[INSERT FINAL VERSION FROM SAIC]
See Attachments to Chapter 2 of the Technical Development Document

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Comment ID 316bNFR.501.025

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Subject Matter Code 9.46
Request for Comment: Consideration of Nonaquatic Impact

Other Environmental Impacts - Air Emissions (page 28867).

EPA states that it assumes that regardless of the outcome of the 316(b) rule for new facilities, they expect that the majority of units would have wet cooling towers and a minority would have once-through or dry cooling systems. We interpret this to mean that the Agency, at least at this moment, might be suggesting a minimal impact on emissions due to few installations of dry systems (which have the higher efficiency impact and therefore the higher emissions impact). They may be correct, but EPA should provide support of their projection that a minority of new facilities would use dry cooling systems. It is possible that water availability issues in the West and Southeast, in combination with the 316(b) requirements, could result in more dry cooling than EPA projects, and therefore, could have a more serious impact on emissions.

EPA also states that they may use the Compilation of Air Pollutant Emission Factors, Volume I (AP-42) to estimate emissions. Emissions factors are based on the "typical" capture effectiveness of pollution control technology in removing pollutants such as SO2, NOx, and particulate matter (PM). Although the use of emissions factors is an accepted approach for estimating emissions, there are specific questions and issues that the Agency needs to consider.

Should additional fuel be used to maintain power output and overcome any energy penalty, then emission increases would be expected. However, there is a distinction between the generation of additional air pollutants due to the combustion of additional fuel to make up for energy penalties associated with wet and dry cooling, and the actual emission of the pollutants to the atmosphere. The distinction is due to the effect of air pollution control technology (e.g., wet scrubbers to remove SO2) in removing the pollutant before it is emitted. We encourage EPA to describe how they will handle this distinction, that is, what emission control equipment will they assume is installed on new power systems, either conventional pulverized coal or Integrated Gasification Combined Cycle (IGCC) plants.

The types of questions that will need to be addressed by the Agency include: (1) what constitutes best available control technology (BACT) for future plants, and how does BACT vary over time, (2) will the plant be equipped with a Selective Catalytic Reduction (SCR) system to control NOx, and if so, what assumption will EPA make regarding the potential for additional ammonia (reagent used to reduce NOx) slip to the atmosphere from the SCR, and (3) given the current state of development of control technology, how will the emission of mercury be handled?

For purposes of estimating emissions at new power plants EPA should assume that a new plant will be equipped with the state-of-the-art emissions control technologies in order to meet the applicable NOx, SO2, and PM requirements. DOE recommends that EPA assume that a new pulverized coal power plant be equipped with a combination of low-NOx burners and SCR for NOx control. DOE further recommends that EPA estimate additional releases of ammonia based on an ammonia slip from the SCR reactor ranging from 2 percent to 5 percent.

In terms of SO2, given the requirement for BACT and the "cap" on SO2 emissions, DOE recommends that EPA assume 95 percent or greater SO2 capture. EPA will still need to specify the coal-sulfur content in order to estimate increases in emissions. DOE recommends that the Agency assume the use of coal commonly used by existing scrubbed plants from nearby regions.

Regarding primary particulate emissions, DOE recommends that EPA estimate increases in emissions based on the plant having a state-of-the-art electrostatic precipitator (ESP) or fabric filter installed. DOE recommends that the September 1998 AP-42 collection efficiencies for ESPs (99.2 percent) and baghouses (99.8 percent) are appropriate to use in estimating potential increases in particulate emissions.

From an emissions standpoint, mercury is a special case with its own set of issues and questions. EPA needs to elaborate on how it will handle mercury. Since there still remains significant uncertainty about how well mercury is removed from combustion flue gas, DOE recommends that the Agency not use existing emissions factors. EPA has just recently completed a mercury Information Collection Request (ICR) in which they have collected data on mercury emissions from power plants, both pulverized coal and IGCC facilities. Does EPA intend to use this data in estimating increases in mercury emissions from power plants? If the power plant is equipped with a wet scrubber, will the Agency assume that all of the oxidized (soluble) mercury is removed in the scrubber? How will EPA deal with the issue of mercury speciation (that is, the form of mercury in the flue gas, recognizing that oxidized mercury is easier to remove)? Again, will EPA use the mercury ICR database? How will the Agency reconcile some of the concerns that have been raised regarding the quality/validity of the ICR data? How EPA decides to deal with mercury will also affect the type of particulate control technology (ESP vs. fabric filter/baghouse) that would be used to estimate increases in primary particulate matter emissions. DOE's development of mercury control technology has shown that the use of a baghouse may increase contact time between vapor-phase mercury and the sorbents (e.g., activated carbon) injected to capture the mercury. It will also influence decisions regarding the approach to SO2 controls.

The resolution of these issues is critical to quantifying the potential impact of 316(b) on emissions.

EPA Response

For discussion of the projections of new facilities and the types of cooling systems to be installed (in absence of this rule) at these facilities see the Economic Analysis. For a discussion of air emissions increases as a result of the rule, see Chapter 3 of the Technical Development Document.

EPA notes that its methodology for estimating the increase in air emissions meets the variety of concerns expressed by the commenter. The Agency based its air emissions estimates on the concept that when a new plant experiences an energy penalty as a result of the installation of technology to meet the requirements of this rule that the energy shortfalls will be met by the rest of the electric generating community and not at the specific facility effected. In turn, the Agency meets concerns of other commenters which hypothesized that some new power plants would not be capable of increasing fuel consumption to compensate for energy penalties.

For the final rule, EPA used measured, reported, and estimated emissions from existing power plants to estimate the expected increase in air emissions due to the compensations for energy penalties. This data represents the actual emissions to the atmosphere for power generation. In turn, the concerns of the commenter that air pollution control equipment will not be included in EPA's analysis are met. Because EPA used data from recently constructed power plants for air emissions estimates, the Agency's projections incorporate the air emissions control requirements of today. The Agency estimates that air emissions profiles from future power plants will only improve, and therefore, conservatively estimates the quantity of each specific pollutant's projected emissions.

In summary, though EPA appreciates the considerable amount of information and direction provided by the commenter regarding air emissions control technologies for a variety of pollutants, the Agency did not require their use due to the simplified methodology used to estimate emissions, as described above and in detail in the supporting documentation (Chapter 3 of the Technical Development Document).

Comment ID 316bNFR.501.026

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Other Environmental Impacts - Water Evaporation (not in NODA).

DOE recommends that EPA take into consideration the water consumption penalty that would be associated with a wet-cooling system versus a once-through-cooling system. That is, on a national basis, it would seem that significantly more water would be lost to the atmosphere via evaporative cooling if new power plants were required to use a wet-cooling tower than would be lost if these same plants were to allowed to use a once-through system. It is not clear that this impact has been factored into the Agency's proposed 316(b) rule for new facilities.

EPA Response

EPA has considered water evaporation due to cooling technologies for the final rule. See response to comment 316bNFR.068.100.

Comment ID 316bNFR.501.027

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Costs for Baseline Biological Study and Other Monitoring (page 28867).

DOE noted in its earlier comments that the costs assumed by EPA for baseline characterization studies appeared to be seriously underestimated. This opinion was corroborated by the experts panel at EPA's May 23 Experts Panel meeting. We recommend that EPA talk to utilities or contractors who have conducted 316(b) and baseline characterization studies to better estimate study and monitoring costs.

EPA Response

EPA has modified the baseline biological characterization requirements in the rule to allow the use of existing data, for both permit issuance and reissuance. EPA has also revised the rule and promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. In turn, EPA has revisited and revised the cost estimates for monitoring based on revisions to the final rule, and those costs are documented for the record in the ICR.

Comment ID 316bNFR.501.028

Subject Matter Code 10.16

Two Track Process

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Industry Approach (page 28868).

EPA describes a two-track approach suggested by the Utility Water Act Group that provides flexibility to 316(b) applicants. Under this approach, a company seeking to build a new facility could pursue either one of two tracks: a) commit to one or more of a number of specified technologies deemed to represent highly protective technology at the outset or b) engage in a site-specific study to determine the best technology available (BTA) for the site. DOE strongly supports this type of framework;, however, we feel the value and efficacy of this approach would be limited if EPA “piles on” too many additional requirements, as was contemplated in the NODA on page 28870.

EPA Response

See response to comment 316bNFR.501.004. Discussions on alternative requirements and additional requirements are also included in section V of today's preamble.

Comment ID 316bNFR.501.029

Subject Matter Code 10.16

Two Track Process

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

One element of the second track of the two track approach with which we feel uncomfortable is the statement that the "best" technology would be designated as the technology that has the highest net benefit. Generally, this will be the best choice, but we suggest that there may be some cases in which the highest net benefit technology doesn't make good sense. Take, for example, the following hypothetical case. Technology A has a cost of $1 million and a benefit of $1.5 million, for a net benefit of $500,000. Technology B has a cost of $100 million and a benefit of $102 million, for a net benefit of $2 million. Under the suggested approach, technology B would be the clear choice. However the cost of technology B is 100 times higher while the benefit is only 4 times higher. The cost-effectiveness (defined here as the ratio of benefits to cost) of technology A is far higher than that of technology B. As an alternative to the process outlined in the NODA, DOE would support identifying a number of alternative approaches to identifying "best" technology, including a decision-making process that chooses the technology with the highest cost-effectiveness or the highest incremental cost-effectiveness (the difference between one technology and the next most expensive technology). This measure of economic fairness is already employed to a limited degree in EPA's effluent limitations guidelines program. Another option is a process similar to that used by the State of Maryland, under which an applicant estimates the total value/cost of the fish impinged over a five-year period and is then liable for implementing a mitigating technology or operational change that costs up to that dollar value. Both of these approaches place practical limits on how much an applicant will need to spend to provide an acceptable level of mitigation. Consistent with our earlier comments recommending preservation of maximum State flexibility, DOE believes that it is important that EPA only requires States to have a clearly defined approach for identifying "best" technology, using criteria which reflect the States values, and that it is preferable that the Federal Government not prescribe a particular approach.

EPA Response

EPA has adopted a technology-based approach to the rule for the reasons discussed in the preamble to the rule. Under this approach EPA has adopted an economic practicability test. See response to comment 316bNFR.206.014 and the preamble to the rule.

Comment ID 316bNFR.501.030

Subject Matter Code 10.16

Two Track Process

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

We have not evaluated the merits of EPA's Ecological Risk Assessment Guidelines compared to other risk assessment approaches, but feel that properly done risk assessment adds scientific value to the process. We note that EPA uses the term "appreciable" risk of AEI. This term could be defined in a variety of ways. We encourage EPA to clearly define it if such an approach is used in a Final Rule.

EPA Response

EPA has adopted an approach for new facilities that uses impingement and entrainment as the metric for determining best technology available for minimizing adverse environmental impact. Please see response to comment 316NFR.040.004.

Comment ID 316bNFR.501.031

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 10.16

Two Track Process

EPA describes a variety of additional requirements that might be made part of a fast track approach. Our thoughts on these are listed below.

** Dry cooling: We oppose any attempt to require dry cooling in a national rule. There may be circumstances under which State or local concerns would cause an individual facility to employ dry cooling. This highly costly technology is costly and increases energy consumption; it should only be required after a site-specific evaluation.

EPA Response

EPA has not promulgated requirements based on dry cooling in today's national rule. However, EPA agrees that dry cooling may be considered by an applicant under certain circumstances and is an acceptable fast track technology under Track I of today's rule. See section V.C of today's preamble for a discussion on why EPA rejected dry cooling as best technology available for minimizing adverse environmental impact.

Comment ID 316bNFR.501.032

Subject Matter Code 10.16

Two Track Process

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

EPA describes a variety of additional requirements that might be made part of a fast track approach. Our thoughts on these are listed below.

**Differing suites of technologies based on location: This may be a practical approach, but we do not support including it in a national regulation. This should be left to the discretion of State regulatory authorities.

EPA Response

EPA disagrees. EPA believes that the national rule should contain additional requirements which provide further minimization of adverse environmental impact. Where is it technically available and economically practicable to do so. Facilities may choose which technologies would work best in its new facility, without additional delays in the approval process. See today's preamble section V for further discussion on this issue.

Comment ID 316bNFR.501.033

Subject Matter Code 10.16

Two Track Process

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

EPA describes a variety of additional requirements that might be made part of a fast track approach. Our thoughts on these are listed below.

** Limited pre-operational monitoring: We generally support this idea as a time-saving approach. We think it should be augmented by a requirement to conduct follow up monitoring after the facility is constructed, however.

EPA Response

EPA agrees. Today's rule does not contain pre-operational monitoring under Track I, where the applicant may opt to install technologies without such delays. In Track II, the applicant must compile data on the site and evaluate which technologies it will install which will cause its compliance to be comparable to Track I; in that case, the applicant may collect additional information and data should existing data not be enough. See section VII of today's preamble for discussions on the implementation issues of this rule.

Comment ID 316bNFR.501.034

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 10.16

Two Track Process

EPA describes a variety of additional requirements that might be made part of a fast track approach. Our thoughts on these are listed below.

** Include proposed monitoring requirements from 40 CFR 125.87: We support the idea of requiring monitoring once the facility commences operations, but want to make sure that the monitoring burden is not unreasonable.

EPA Response

Today's rule include a verification monitoring requirement designed to assure that the technology employed is performing as designed. EPA believes this requirement to be reasonable and necessary in order to make sure the technologies are attaining the goals of the Clean Water Act. See section VII of today's preamble for discussions on implementation of today's rule.

Comment ID 316bNFR.501.035

Subject Matter Code 10.16

Two Track Process

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

EPA describes a variety of additional requirements that might be made part of a fast track approach. Our thoughts on these are listed below.

** Allow State permitting agency to revisit 316(b) decision: We agree that the permitting agency should have the ability to revise its original determination of AEI if post-operational monitoring provides evidence of greater AEI than anticipated.

EPA Response

EPA agrees that today's rule allows the permitting authority to revisit the requirements of this rule once the facility is in operation and verification monitoring is performed and the technologies found not to be performing as intended. However, EPA does not see this process as a revisitation of the "determination of adverse environmental impact", but the issue is the performance of the employed technologies installed to minimize adverse environmental impact. See section V for a discussion on the basis for today's final regulation and section VII for a discussion on the implementation issues.

Comment ID 316bNFR.501.036

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 10.16

Two Track Process

EPA describes a variety of additional requirements that might be made part of a fast track approach. Our thoughts on these are listed below.

**Other pre-operational monitoring: We concur with this type of monitoring discretion.

EPA Response

See section VII for a discussion on implementation issues of today's rule.

Comment ID 316bNFR.501.037

Subject Matter Code 10.16

Two Track Process

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

EPA describes a variety of additional requirements that might be made part of a fast track approach. Our thoughts on these are listed below.

** Flow thresholds for requiring impingement monitoring: We support the use of the same thresholds described in comment number 1, Regulatory Thresholds, above for this situation too.

EPA Response

See section V and section VII for more discussions on the basis of today's rule and its implementation.

Comment ID 316bNFR.501.038

Author Name Robert S. Kripowicz

Organization U.S. Dept. of Energy

Subject Matter Code 18.1

Elimination of "Wholly Disproportionate" Cost Test

EPA seeks comments on whether it should use the "wholly disproportionate" cost/benefit test. DOE does not support this concept. We think that a rationale comparison of costs to benefits should be made to assess the merits of specific technologies.

EPA Response

EPA agrees with the commenter's claim that the "wholly disproportionate" is not appropriate for BTA determination. For further information on EPA's position on use of the "wholly disproportionate" test for BTA determination, see EPA's response to comments 316bNFR.052.009 and 316bNFR.068.320 above.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Vernon B. Lang

On Behalf Of:

U.S. Fish & Wildlife Service

Author ID Number:

316bNFR.502

Comment ID 316bNFR.502.001

Subject Matter Code 10.13

Request for Comment: Uniform Set of Standards Applicable to All Facilities

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Section D.3. Revised Definition of Estuary and Ocean

As currently proposed, a consistency issue may arise with the new definitions for estuary and ocean. Confusion could potentially arise because ocean is a defined term in 33 U.S.C. 1362(10) and has a different meaning than the word ocean in the present proposal. Perhaps the term territorial sea, which is also defined in the Clean Water Act, could be used to help make the distinction between the waterbodies being discussed.

EPA Response

See response to 316bNFR.068.056 and 008.010..

With regard to oceans, the commenter points out that a different definition of ocean than proposed exists in the Clean Water Act, but does not identify an actual problem. The final rule adopts a two-track approach that balances the need to provide clarity, consistency, and faster permitting through specifying technology-based performance requirements in Track I, with the need to allow for site-specific flexibility, through allowing a new facility to demonstrate comparable performance with Track I through other means under Track II. This approach is not premised on defining different categories of waterbodies, such as was proposed. Only the proportional flow requirements in the final rule are waterbody-specific, and no proportional flow requirement exists in the rule for oceans.

Comment ID 316bNFR.502.002

Subject Matter Code	10.011
River/Stream--Proposed Standards	

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Section D.5. Freshwater Rivers and Streams

I recommend that EPA not accept the notion advanced by some commentors that aquatic species predominant in freshwater rivers and streams have reproductive and life history strategies that generally make them less susceptible to the impact of cooling water intake structures than is the case for species in lakes, oceans and estuaries. This is an overly broad notion that can be applied equally well to aquatic species predominant in lakes, ponds, oceans, and estuaries. For example, many species that live in oceans, estuaries, lakes and ponds migrate into freshwater rivers and streams for reproduction and early life stage development. These reproductive life history strategies put these species at higher risk from impact by cooling water intake systems in rivers and streams during migration to and from spawning habitat and for migrations of juveniles to adult or growth habitat. This strategy makes the species less susceptible to impact from cooling water intake systems in lakes, ponds, estuaries and oceans and puts the species at much higher risk from CWIS impacts in rivers and streams. Not all stream spawning species of fish have adhesive and/or demersal eggs. The eggs of some species such as the anadromous American shad and striped bass are semi-buoyant and non-adhesive. Most stream spawners however, have adhesive and/or demersal eggs or construct a nest for egg deposition. In nearly all species that spawn in rivers and streams, the fry stage is planktonic and/or has very weak swimming ability which puts this life stage at higher risk from cooling water intake structures. Some lake spawners construct nests and guard the eggs and fry until they develop swimming and feeding ability sufficient for dispersal, e.g., centrarchids. Other lacustrine species such as the esocids utilize marshes as spawning and early life stage habitat, a strategy that would keep the egg, larval and fry stage away from likely locations for an CWIS. Similar strategies exist for some marine species such as the sticklebacks, sculpins, wolffish, and sharks that give live birth.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for consistent protection of species impacted by CWISs across all waterbody types. EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones.

EPA has determined that reducing impingement and entrainment on fresh water bodies to the same level as in estuaries and oceans to be technically feasible and economically practicable and believes that this approach affords the same level of protection to all waterbodies.

Instead of varying requirements based on waterbody type EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing

adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

Comment ID 316bNFR.502.003

Subject Matter Code 10.011

River/Stream--Proposed Standards

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

In reviewing the proposed rule, it is apparent that most of the discussion on impacts of cooling water intake systems is centered on entrainment and impingement of aquatic organisms, e.g., Section F.1. Habitat effects are less frequently mentioned perhaps because of the focus on ocean, estuary and lake ecosystems where the physical effect of water withdrawals on habitat is less pronounced. However, in rivers and streams the effect of cooling water withdrawals on habitat is frequently a major consideration. For example, the seasonal flow restrictions in the New England Flow Policy are directed at habitat protection as a means of protecting life cycle functions of aquatic life. As discussed in prior correspondence, these flow limitations to protect aquatic habitat are more restrictive than the flow limitations or capacity standards in the proposed rule designed to protect against excessive entrainment and impingement losses. Accordingly, I do not believe that location or capacity considerations would support less restrictive technology standards for rivers and streams as suggested in D.5.

EPA Response

See response to comment 316bNFR.502.002.

Comment ID 316bNFR.502.004

Subject Matter Code	7.0
Scope and Applicability of Proposed Rule	

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Additional Data and Information Concerning the Definition of Adverse Environmental Impact.

In addition to information in the record for this rulemaking, EPA should consider policy contained in the Water Quality Standards Handbook, EPA approved state water quality standards and NPDES regulations pertaining to the prohibition of lethality to organisms swimming, drifting or otherwise passing through a mixing zone. Among other considerations, this policy implements 33 U.S.C. 1251(a)(3) regarding the prohibition of discharges of toxic pollutants in toxic amounts, e.g., the prohibition of lethality from or in a regulable discharge. Since discharges to waters of the U.S. are prohibited from creating lethal conditions to aquatic life swimming or drifting through a mixing zone, e.g., [40CFR 122.4,122.44(d)], it would seem to be logical to extend this prohibition to intake systems that are subject to CWA regulation especially those where the intake and discharge are integral components of the same facility. To do otherwise would seemingly reach an absurd result since it would interpret Congressional intent to mean that we are required to protect aquatic life from lethal effects in the discharge but it is somehow okay to kill the same aquatic life in the intake system that we are protecting in the discharge system. This is a classic case where it could be said that the right hand does not know what the left hand is doing. I do not believe that the statute contemplates or commands this result where we protect aquatic life from lethality at one end of the pipe (discharge) and we allow lethality at the other end of the pipe (intake). If this were so, section 316(b) would likely not exist. A more reasonable interpretation is to promulgate and maintain equally protective standards for both ends of the regulable pipe.

EPA Response

EPA has considered how this rule relates to other requirements under the NPDES program, including water quality protection requirements applicable to the discharge of pollutants. However, this rule is based on CWA section 316(b), which provides that any standard established pursuant to section 301 or 306 of the CWA and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact. Consistent with this statutory requirement, which is the only provision in the CWA that focuses exclusively on water intake, EPA has attempted to develop this rule such that it furthers the goals of the CWA and complements the requirements of the existing NDPES program.

Comment ID 316bNFR.502.005

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

I recommend EPA adopt the third alternative definition of adverse environmental impact listed in the draft rule because it would promote and maintain consistency in the implementation of the prohibition against lethality in both discharge and intake systems and add clarity to the rule.

EPA Response

Please see response to comment 316bNFR.029.013 for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.502.006

Subject Matter Code 9.44

Request for Comment: Definition of AEI

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

With regard to the issue of clarity in the term adverse environmental impact, I would suggest that it be expanded in scope to include other adverse impacts such as a water withdrawl reducing stream flow below thresholds established to protect aquatic life, e.g., a cooling water system that would withdraw water from a stream when streamflow is below 0.5 cfsm in New England streams. This accommodation could be made by adding the words “or other adverse effects to aquatic life or wildlife” at the end of the phrase “any impingement or entrainment of aquatic organisms” on page 65 FR 49074 of the draft rule.

EPA Response

EPA agrees that velocity is a critical factor for minimizing impingement and entrainment. Under Track I of today's rule, new facilities must meet the requirement of reducing maximum through-screen design intake velocity to 0.5 ft/s. Also, please see EPA's interpretation of AEI in Section VI.B.2.a. of the preamble for today's rule.

Comment ID 316bNFR.502.007

Subject Matter Code	10.0
Best Technology Available	

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Section E.5. Other Options for Interpreting Adverse Environmental Impact

In this section, EPA makes the suggestion that best technology available to minimize adverse environmental impact could be defined with a focus on technology, instead of impact, in a manner analogous to technology-based standards found in sections 301, 304 and 306 of the Clean Water Act. This is an interesting proposal in that the language in 316(b) is much more straight forward and devoid of the qualifying terms used in sections 301, 304 and 306. In these sections, technology was conditioned by terms such as best practicable, best conventional or best available economically achievable. This language is absent in section 316(b) which would indicate that the words should be interpreted to have their plain meaning, e.g., a demonstrated technology that avoids adverse environmental impact, would have achieved maximum possible minimization of adverse effects and therefore, represents best technology available. Accordingly, EPA should use this evidence of Congressional intent and clarity to define adverse environmental impact by adopting the third alternative definition of adverse environmental impact listed in the draft rule. This definition is supported by the demonstration by industry that dry cooling is the best technology available to minimize adverse environmental impact because it avoids the use of cooling water, an associated cooling water intake system and impacts on the aquatic environment. Therefore, EPA should define dry cooling systems as the best technology available for minimizing adverse environmental impact. The EPA should not, as suggested in Section H.1 (Fast-Track), define dry cooling as exceeding best technology available because the language in 316(b) is clear and unencumbered with qualifiers unlike the case for sections 301, 304 and 306. The prescribed limitations on technology under sections 301, 304 and 306 often leads to the requirement for more advanced technology, e.g., greater degree of treatment than BPT or BCT, in water quality limited segments. An analogous situation does not appear to exist under 316(b) because it would seem that no other technology could be better than best technology available. This would appear to leave room for applicants to make a demonstration that some other technology in a particular situation would be equal to dry cooling in terms of avoiding adverse environmental impacts but not be better than the best technology available (dry cooling).

EPA Response

EPA disagrees that costs may not be considered in making a technology-based decision. See 316bNFR.206.014. The term “available” implies some consideration of technical and economic “practicality.” Seacoast Anti-Pollution League v. Costle, 597 F.2d 306 (1st Cir. 1979). The word minimize also suggests that EPA need not select the option that eliminates AEI. Hudson Riverkeeper Fund, Inc. v. Orange Rockland Util., Inc., 835 F. Supp,. 160, 165-66 (S.D. N.Y. 1993)(“best available” does not mean perfect.)

EPA rejects dry cooling as best technology available for a national requirement because the technology of dry cooling carries costs that are sufficient to pose a barrier to entry to the marketplace for some projected new facilities. Dry cooling technology also has some detrimental effect on

electricity production by reducing energy efficiency of steam turbines and is not technically feasible for all manufacturing applications. Finally, dry cooling technology may pose unfair competitive disadvantages by region and climate. Further, the two-track option selected is extremely effective at reducing impingement and entrainment, and while the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so at a cost that is more than three times the cost of wet cooling. Therefore, EPA does not find it to represent the "best technology available" for minimizing adverse environmental impact. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). An application of dry cooling will virtually eliminate use of cooling water and impingement and entrainment, in almost all foreseeable circumstances, would reduce a facility's use of cooling water below the levels that make a facility subject to these national minimum requirements.

Please refer to Sections III and VI. B in the final rule for EPA's description of what constitutes adverse environmental impact under this final rule.

Comment ID 316bNFR.502.008

Subject Matter Code	12.11
5% Mean Annual Flow	

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Section F.1. Proportional Flow Limits for Freshwater Streams and Rivers and Tidal Rivers, Estuaries

I urge EPA to expand the breath of the analysis of flow limits beyond the discussion of impingement and entrainment effects. While these are important considerations, they are not the only effects that need to be considered when establishing limiting flow conditions for the protection and propagation of aquatic life and wildlife. As my comments for section D.5. indicate, instream flow criteria or levels are frequently established to protect the physical habitat necessary to provide for growth, spawning, incubation, refuge, migration, temperature regulation, predator avoidance and other life cycle functions of aquatic life and wildlife. It would be a great disservice for EPA to promulgate a rule that could be interpreted as establishing a national minimum flow standard of 25% of 7Q10 or 5% of AAF. These are clearly unacceptable criteria as minimum flow standards since they are significantly less stringent than commonly accepted flow criteria developed from methods such as the New England Flow Policy (ABF), Tenant and the Instream Flow Incremental Method (IFIM). If the proposed framework is retained, I would recommend that EPA craft the final rule such that the 25% of 7Q10 or 5% AAF criteria could only be interpreted as capacity standards subject to a limiting instream flow criterion established to provide for the protection and propagation of aquatic life and wildlife such as ABF. This would mean, and should be made clear in the rule, that either offstream sources of cooling water would be required or the ability to switch to a dry cooling mode would be required when streamflow reached or fell below the instream standard, e.g., 0.5 cfsm, 1.0 cfsm, depending on seasonal period.

EPA Response

Today's final rule establishes a design intake flow criterion for new facilities. For facilities withdrawing water from a freshwater stream or river, the design intake flow cannot exceed 5% of the source water's mean annual flow. This standard is not applicable to the daily operation of a facility's cooling water intake structure. That is, a facility is not expected to constantly monitor the instream flow of the source water and adjust its water intake accordingly. EPA believes the design intake flow standard for riverine facilities affords a level of protection for the source water body acceptable under most, if not all, stream conditions. In extreme circumstances, the permitting authority may implement additional measures of protection as permitted by Section 125.85.

The alternative methods discussed by the commenter, under ideal circumstances, may be able to establish a more accurate capacity restriction. However, the limitations prevent EPA from adopting any of these methods as a criterion for freshwater rivers and streams. For example, the IFIM and Tennant Method require significant amounts of historical biological, hydrologic and climatologic data to construct the model. Such data is not always available for all regions of the United States. In addition, these exercises would need to be performed on each river, or river segment, that might support a new facility. This is an overly burdensome proposition that may result in a barrier to entry for new facilities and is incompatible with the establishment of a nationally applicable standard.

Comment ID 316bNFR.502.009

Subject Matter Code 10.16

Two Track Process

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Section H. Industry Approach

I urge EPA not to accept the two-track approach proposed by the Utility Water Act Group because it would likely weaken the existing regulatory landscape regarding the administration of section 316(b). Currently, an applicant could develop an application that would proceed rather quickly or rather slowly through regulatory channels by choosing either highly protective cooling technology or open cycle cooling. The UWAG proposal would essentially codify past industry practice into rule and in the process, weaken existing and potential future standards. As an example, the technology identified in the fast-track process does not reflect best technology available. Dry cooling is not mentioned as best technology available or even as a highly protective technology in the UWAG proposal. In addition, no single best technology available is identified from among the list of "highly protective technologies". Instead the UWAG proposal supplies a menu of technologies that could be applied to specific sites including unproven innovative technology that could be added to open cycle cooling to represent BTA.

Under track 2 of the UWAG proposal, an applicant would conduct various site-specific studies to justify that the proposed intake would not create an appreciable risk of adverse environmental impact or that some technology could be installed to minimize adverse environmental impact. Incumbent with this and the fast-track proposal is the notion that some entrainment and impingement mortality can occur without creating adverse environmental impact in contravention of the prohibition on lethality in regulable intake and discharge systems. If EPA codifies this notion in the UWAG proposal into rule, it would likely help create the slippery slope of ambiguity and may produce the kind of regulatory paralysis analogous to that under 316(a) where ambiguous language occurs in the statute regarding standards for thermal effects.

EPA Response

EPA is not accepting the industry two-track approach. See preamble section V.D and elsewhere in this comment response document for further discussion on this issue. EPA agrees with the commenter that many of the technologies cited by the commenter do not, on a nationwide basis, represent best technology available for minimizing adverse environmental impact. Instead EPA is requiring that a performance standard commensurate with closed-cycle recirculating systems is required, and that under Track II, a comparable level is achieved. Although EPA is allowing some flexibility under Track II on how the facility may achieve such comparable level, the permittee make the demonstration and must show it is being achieved, even after installation. See section V and section VII for further discussions on Tracks I and II and their implementation, respectively.

Comment ID 316bNFR.502.010

Subject Matter Code MISC

Miscellaneous Comment

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

The EPA has the opportunity to craft definitions and regulatory structure in this rulemaking that would not only streamline and simplify the administration of section 316(b) but at the same time, greatly increase the level of protection afforded aquatic life and wildlife.

EPA Response

The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. The final rule streamlines and simplifies the administration of section 316(b), while greatly reducing impingement and entrainment of aquatic life at new facilities.

Comment ID 316bNFR.502.011

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

I urge the EPA to adopt the third alternative definition of adverse environmental impact listed on page 65 FR 49074 of the draft rule with the modifications proposed herein. This definition would promote and maintain a consistent application of the policy prohibiting lethality in regulable intake and discharge systems in accordance with 33 U.S.C. 1251(a)(2), 1311, 1327(b) and 1342.

EPA Response

Please see response to comment 316bNFR.029.013 for EPA's interpretation of AEI under today's rule.

Comment ID 316bNFR.502.012

Author Name Vernon B. Lang

Organization U.S. Fish & Wildlife Service

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The EPA should define best technology available to be a dry cooling system because it is proven technology that avoids the use of cooling water and attendant adverse environmental impacts on aquatic life and wildlife. These definitions would provide applicants the opportunity to demonstrate that some other technology at a particular site could avoid adverse environmental impact as defined herein, e.g., no entrainment, impingement or other adverse effects, on a basis equal to that obtained from dry cooling. In doing so, the rule would further the purposes of the Clean Water Act.

EPA Response

See response to comment 316bNFR.073.034.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kent Satterlee

On Behalf Of:

National Ocean Industries Assoc

Author ID Number:

316bNFR.503

Note

Fully supports the comments made by API (316bNFR.510)

Comment ID 316bNFR.503.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

The OOC and NOIA support and endorse the comments submitted by the American Petroleum Institute (API) and the International Association of Drilling Contractors (IADC) and will focus its comments on offshore oil and gas exploration and production activities in the Gulf of Mexico. Although the proposed regulations address only new facilities, OOC and NOIA believe many of the same assumptions will be used by EPA in the forthcoming regulations for existing facilities.

EPA Response

Today's final rule applies only to new facilities. Today's rule does not address offshore oil and gas facilities. See the preamble to today's final rule.

Comment ID 316bNFR.503.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

The OOC and NOIA oppose the cooling water intake rule as currently proposed. As pointed out in our comments on the proposed rule dated November 8, 2000, EPA did not consider offshore oil and gas facilities in its cost/benefit analysis. The economic impact could be large and could potentially disrupt drilling/production operations. EPA also did not demonstrate adverse environmental impacts to the offshore environment from cooling water intake structures on offshore facilities. Additionally, EPA did not consider the impact to existing mobile drilling units, which could be considered new sources when drilling development wells.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.503.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Offshore and coastal oil and gas drilling facilities have much more limited technology options for addressing any adverse environmental impact of cooling water intake than land-based facilities

As the OOC pointed out in its November 8, 2000 comments on the proposed rule, EPA did not establish guidance or threshold values on what would constitute “adverse environmental impact” and has not shown that, in fact, cooling water intake structures on offshore platforms cause adverse environmental impacts. Additionally, the OOC provided in its previous comments underwater video footage of three cooling water intake structures from offshore platforms and rigs that clearly showed no entrainment or impingement impacts on fish. We understand that this video does not represent a comprehensive survey of environmental impacts; however, the burden should be on EPA to establish thresholds for adverse environmental impact and then to show that these impacts do, in fact, occur before setting restrictions on these intake structures.

Offshore facilities have unique constraints relative to the majority of facilities in the United States. They are limited in physical space and payload capacity, as will be further developed below. Thus they are limited in technology options for cooling requirements. Further these facilities operate in open water at depths ranging from tens of feet to thousands of feet. They are subject to significant wave loading from winter storms, hurricanes and stresses due to loop currents. Technology options for addressing any adverse environmental impacts are limited due to the physical constraints of the operating environment. The wave loading design criteria for offshore platforms can be found in standard API RP-2A which can be obtained from API’s website: www.api.org.

EPA Response

EPA will use the commenter's video and other information to assess potential impacts and benefits of potential Phase III 316(b) controls for the Coastal and Offshore oil and gas industry (See responses to comments 316bNFR.022.002 and 316bNFR.022.006).

EPA agrees with the commenter that there are significant differences between oil and gas facilities located onshore and those located over water (i.e., Offshore and Coastal facilities). Some of these differences are described by the commenter (e.g., limited physical space and payload capacity, operating environment constraints). EPA will consider these differences and others in developing any potential Phase III 316(b) controls for the Coastal and Offshore oil and gas industry.

Comment ID 316bNFR.503.004

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Under current regulations (40 CFR 435.11), existing mobile oil and gas extraction facilities are considered new sources when they operate on new development wells and, could be required to perform costly retrofits in order to comply with the 0.5 ft/s velocity standard if they become subject to the proposed requirements for cooling water intake structures at new facilities

The OOC pointed out in its November 8, 2000 comments that mobile drilling rigs, which are themselves existing equipment, could be considered “new sources” when they drill new development wells under 40 CFR 435.11. Under this scenario, these rigs may be subjected to the proposed “existing source” rule. This scenario does not apply to production “extraction” facilities. The IADC comments provided to Carey Johnston address rig retrofit scenarios and costs.

Retrofit cost for production facilities will vary depending on the type of cooling water intake structure the facility has in place. A cost estimate was developed for a floating production system tension leg platform (TLP). Under this scenario, it was assumed that the TLP had a seachest intake structure with a pre-existing flange on the exterior of the intake structure which could be used to bolt on a larger diameter intake in order to reduce the intake velocity to below 0.5 ft/s. The estimated cost to retrofit this new intake is $75,000. The detailed cost estimate is found in Attachment I. The drawing for the TLP seachest is also attached.

This same cost can be assumed for retrofiting a deep well pump casing with a larger diameter intake provided the bottom of the casing is not obstructed and the intake structure can be clamped over the casing.

For TLP's with seachests without a pre-existing flange for an intake structure and for deep well pump casings that are obstructed and prevent the installation of an intake structure, the retrofit costs are estimated to be much higher. If underwater welding or the installation of new pump casing is required, the costs can be as high as $500,000. In these cases, the platform would need to be shut-in for some period of time (1-3 days) to allow for this installation. Included in this estimate is the need to provide for additional stiffening of underwater legs and supports to resist the wave loading forces of the new intake structures. Many facilities have multiple deepwell casings or seachests that would require retrofitting.

EPA Response

Please see responses to comments 316bNFR.022.002 (offshore and coastal oil and gas facilities to be addressed in Phase III 316(b) rule) and 316bNFR.022.005 (retro-fits of existing facilities).

EPA will use the information provided by the commenter and other commenters in assessing costs to retro-fit offshore and coastal oil and gas facilities. EPA worked with the U.S. Coast Guard to identify potential costs. Mr. Magill (U.S Coast Guard) stated that he did not have a good estimate of these

costs but did have a general idea of the work requirements for these potential retrofits. Mr. Magill stated that retrofits for drill ships and semi-submersibles that use seachests as the CWI structure would be in the millions of dollars (8-10) and require several weeks to months for drydocking operations. Complicating matters is that there are only a few deepwater dry-dock harbors capable of handling semi-submersibles. Costs for retro-fitting jack-ups would likely be much less complicated and expensive than sea chest retro-fits. Mr. Magill assumed that operators could install a bell or cone intake device on the existing CWI structures to reduce CWI velocities.

EPA will consider these potential costs in assessing regulatory options for offshore and coastal oil and gas facilities in the Phase III 316(b) rule.

Comment ID 316bNFR.503.005

Subject Matter Code	13.3
Request for Comment: Consideration of Site-specific Determinations	

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Higher cooling water intake velocities are necessary in marine waters to control biofouling of cooling water intake structures.

We have noted that the ASCE "Design of Water Intake Structures for Fish Protection" recommends an approach velocity in the range of 0.5 to 1 ft/s for fish protection and 1 ft/s for debris management but does not address biofouling specifically. We have been unable to find technical papers to support a higher intake velocity, but we will continue to search for documentation.

Some facilities have the capability to back flow compressed air through the intake structure to flush any obstructions in the flow, including marine growth. Additionally, some facilities use copper-nickel piping in the seawater system to inhibit marine growth.

EPA Response

See response to comment 316bNFR.022.007. EPA agrees with the commenter that there are several options available to operators to limit marine growth (e.g., compressed air back flush, copper-nickel piping). EPA also notes that at least one cooling water intake screen vendor (Johnson Screens) can incorporate both a compressed air back flush and a copper-nickel screen for marine applications to essentially eliminate marine biofouling concerns.

Also see 316bNFR.028.031 and 316bNFR.063.010.

Comment ID 316bNFR.503.006

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Cooling water intake structure capacities (e.g., volumes of water used per unit of time) and velocities (specifically whether measured on a through-screen or approach velocity basis) for various types of offshore and coastal oil and gas extraction facilities

IADC provided substantial data concerning cooling water intake capacities for drilling rigs. Based on information provided by H&P Drilling, a typical platform rig for a TLP will require 10- 15 MM Btu/hr heat removal for its engines and 3 - 6 MM Btu/br heat removal for the brake. The total heat removal (cooling capacity) is 13 -21 MMBtu/hr.

OOC has estimated that approximately 200 production facilities have seawater intake requirements that exceed 2 MGD. Typically these facilities will range from 2 - 10 MGD seawater intake requirements with one-third or more of the volume needed for cooling water. Other seawater intake requirements include firewater and ballasting. The firewater system on offshore platforms must maintain a positive pressure at all times and therefore requires the firewater pumps in the deep well casings to run continuously. Ballasting water for floating facilities may not be a continuous flow but is an essential intake to maintain the stability of the facility.

EPA Response

Offshore and coastal oil and gas extraction new facilities are not subject to this rule. EPA will use the commenter's data and other information to assess potential requirements for offshore and coastal oil and gas extraction facilities in the upcoming Phase III 316(b) rule. See response to comment 316bNFR.022.002.

Comment ID 316bNFR.503.007

Subject Matter Code	13.3
Request for Comment: Consideration of Site-specific Determinations	

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Velocity requirements and other preventative measures (e.g., type and amount of chemical treatment, backwashing) for inhibiting growth of marine organisms

See our response to item 3. [see 316bNFR.503.005]

EPA Response

See responses to comments 316bNFR.022.002, 316bNFR.022.007, 316bNFR.503.005, 316bNFR.028.031, and 316bNFR.063.010.

Comment ID 316bNFR.503.008

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Potential issues (e.g., hull design implications, load paths, fatigue, risks to divers) related to either: (1) retrofitting sea chests and other cooling water intake structures for existing offshore and coastal oil and gas extraction facilities; or (2) outfitting newly-built offshore and coastal oil and gas extraction facilities with cooling water intake structures consistent with the proposed requirements for new facilities

See our response to item 2 for retrofits. [see 316bNFR.503.004] There are potential issues for some facilities that will require stiffening to reduce localized stresses and risk of fatigue failure. Any underwater diving work carries inherent safety risks. Examples include low visibility, entanglement in cables/piping, handling heavy equipment/tools underwater, underwater explosions, depth constraints, etc. While underwater work is not uncommon with offshore facilities and safety systems are in place to minimize the risks of this type of installation, there are safety hazards and it is expensive. For facilities under construction, cooling water intake structure design can be modified with only minimal cost increase to the facility.

EPA Response

See responses to comments 316bNFR.022.002, 316bNFR.022.005, and 316bNFR.503.004. EPA agrees with the commenter that for facilities under construction the cooling water intake structure design can be modified with only minimal cost increase to the facility.

Comment ID 316bNFR.503.009

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Estimated costs to retrofit existing facilities or to outfit new facilities as described in the preceding bullet, with as much detailed information as possible regarding the basis for the estimates.

See our responses to items 2 and 6. [see 316bNFR.503.004 and 316bNFR.503.008]

EPA Response

See response to comments 316bNFR.503.004 and 316bNFR.503.008.

Comment ID 316bNFR.503.010

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Potential scheduling impacts on new or existing mobile offshore and coastal oil and gas extraction facilities due to section 316(b) requirements for new facilities

IADC has provided information to Carey Johnston on this item for drilling rigs. In some cases, especially with drill ships, significant scheduling impacts would be expected due to the dry dock requirement for retrofits. For production platforms, scheduling impacts for new facilities are not expected since intake structures can be modified during platform fabrication.

EPA Response

See response to comment 316bNFR.503.008.

Comment ID 316bNFR.503.011

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

What issues or costs, if any, would make technologies for zero use of cooling water unavailable or economically impracticable on offshore and coastal oil and gas extraction facilities.

Offshore production platforms will typically use direct air cooling or cooling with a closed loop system for cooling requirements where technically feasible. The following items are typically direct air cooled: gas coolers on compressors, lubrication oil coolers on compressors and generators, and hydraulic oil coolers on pumps. These coolers will range from 1 to 35 MM Btu/hr heat removal capacity. Seawater cooling is necessary in many cases because space and weight limitations render air cooling infeasible. This is particularly true for floating production systems which have strict payload limitations.

One drilling contractor provided costs to convert from seawater cooling to air cooling with a radiator on a platform rig. In this case, a cantilevered deck was installed onto the side of the pipe rack. The radiator was rated at about 15 MM Btu/br, and the cost for the installation was about $150,000. The weight of the addition was about 15,000 pounds. The cost of space and payload on an offshore platform is about $5/pound; therefore, the added weight cost about $75,000 bringing the total cost to about $225,000.

EPA Response

See response to comment 316bNFR.028.022.

Comment ID 316bNFR.503.012

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

Any impingement or entrainment data collected at coastal or offshore oil and gas extraction facilities.

See our response to item 1. [see 316bNFR.503.003]

EPA Response

See response to comment 316bNFR.503.003.

Comment ID 316bNFR.503.013

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

EPA is considering not including within the scope of this Phase I rule offshore and coastal oil and gas operations. Instead of addressing oil and gas operations as part of this rulemaking, EPA is considering addressing oil and gas operations as part of either the Phase II or Phase III rulemaking. Alternatively, if EPA addresses offshore and coastal oil and gas facilities in this Phase I rule, EPA is considering a higher regulatory threshold for these facilities (e.g., 25 or 50 MGD).

The OOC and NOIA strongly support addressing oil and gas operations as a part of a later rulemaking to allow EPA time to address the adverse environmental impacts issue of CWA 316(b) as we have discussed in item 1. [see 316bNFR.503.003] Our hope is that EPA would become better informed of the unique operating environment of offshore facilities and not apply a one-size-fits-all approach.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.503.014

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

We strongly support a higher regulatory threshold for offshore facilities of at least 25 MGD and a revised threshold of at least 50% of the total volume being cooling water to trigger the rule.

EPA Response

See response to comment 316bNFR.022.002.

Comment ID 316bNFR.503.015

Subject Matter Code MISC

Miscellaneous Comment

Author Name Kent Satterlee

Organization National Ocean Industries Assoc

The cooling water intake rule as currently proposed would apply to offshore oil and gas extraction facilities since many of these facilities have cooling water intake structures with design flow of greater than 2 MGD. Existing mobile drilling units with design flows as high as 20 MGD could be captured under the proposed rule by their classification as a "new source" by the Offshore Effluent Limitation Guidelines. EPA has acted prematurely in proposing BTA since it has not defined, as required by the CWA Section 316(b), "adverse environmental impact." Additionally, EPA did not consider offshore oil and gas facilities or mobile drilling units in its cost/benefit analysis and therefore may have significantly underestimated the burden of the proposed rule.

OOC and NOIA recommend that EPA specifically exclude offshore oil and gas facilities and mobile drilling units from the applicability of this rule unless EPA can document any adverse environmental impacts from cooling water structures. Additionally, we strongly recommend that EPA set the applicability criteria at greater than 25 MGD design flow for intake structures in open ocean environments, and the cooling water intake threshold to be at least 50% of the total intake flow. If EPA documents and defines adverse environmental impact due to offshore cooling water intakes, they should then work with offshore industry organizations to develop reasonable methods to mitigate those impacts.

EPA Response

See response to comment 316bNFR.022.002.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Michael Ekholm

On Behalf Of:

US Filter/Johnson Screens

Author ID Number:

316bNFR.504

Comment ID 316bNFR.504.001

Subject Matter Code 17.1

Intake Screens

Author Name Michael Ekholm

Organization US Filter/Johnson Screens

I have compiled a quick list from our older installations. It has several CuNi screen users, but should not be considered a complete list. As I mentioned in our meeting, we are in the process of consolidating all of our installation lists and contacts for these types of screens. This list will not be completed by June 25th but hopefully the short list of what appears to be seawater intakes will be of some use. As far as I know, these screens have been functioning properly. Most of the screens we supply do have an integral air scour pipe.

[see original document for table/list]

EPA Response

EPA appreciates the submittal of this information by the commenter.

Comment ID 316bNFR.504.002

Subject Matter Code 13.1

Requirement of 0.5 fps

Author Name Michael Ekholm

Organization US Filter/Johnson Screens

Designed screen velocity has always been .5 fps max unless otherwise requested by our customers

EPA Response

The information submitted by the commenter supports the approach adopted by EPA for the final rule. Given the compilation of supporting data presented in the proposed rule, the NODA, and other information in the record for this rulemaking, the final rule retains the Track I intake velocity requirement of 0.5 ft/s through-screen velocity which EPA proposed.

Comment ID 316bNFR.504.003

Subject Matter Code MISC

Miscellaneous Comment

Author Name Michael Ekholm

Organization US Filter/Johnson Screens

The last one on the list, Texaco Harvest, appears to be an offshore oil/gas installation. I do not currently have any additional information on this installation but I will try and complete the contact details.

[see original document for table/list]

EPA Response

EPA will use the information provided by the commenter and other information to examine all options for the upcoming Phase III 316(b) rule.

Comment ID 316bNFR.504.004

Subject Matter Code	17.1
	Intake Screens

Author Name Michael Ekholm

Organization US Filter/Johnson Screens

Typical lead time is 2 weeks for drawing submittal, 4-8+ weeks for intake manufacture depending on the size of the screen.

The costs will depend on capacity, depth and slot (screen opening size) but for example:

Johnson SWS Intake Model T33
63 wire with 0.039 circumferencial slot
Installation at 10 Ft depth
5 MGD per assembly
Thru Slot Velocities (fps'): .435 Max .396 Avg
End Fittings: plate one end, plate other end.
Connected to 24PS inlet pipe
Material: ZAL
Estimated net wt: 1074 Lbs

Budget Price: $l6,780 each ($US)

This example is for an arbitrary 5 MGD capacity screen. I can quickly work up pricing on any specific flow values that are required. Please not that this is an order of magnitude price, and would be adjusted for current material costs at the time of bid.

EPA Response

EPA appreciates the submittal of this information by the commenter.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Rep. Chris R. Wogan

On Behalf Of:

House of Representatives,
Commonwealth of PA

Author ID Number:

316bNFR.505

Comment ID 316bNFR.505.001

Author Name	Rep. Chris R. Wogan
Organization	House of Representatives, Commonwealth of PA

Subject Matter Code CP

Comment Period

As I understand it, the Federal Register notice provides only a thirty-day comment period and asks for comment on an array of scientific, biological, engineering, economic, social and environmental concerns affecting the management of state run National Pollutant Discharge Elimination System (NPDES) programs on the welfare of our residents and the resources on which they derive benefit and recreation. As Chairman of the Pennsylvania House Consumer Affairs Committee, I am respectfully requesting that any additional comments this Committee may choose to file after the June 25, 2001 comment deadline be given due consideration. Below are my comments on only selected critical issues presented in the Notice of Data Availability (NODA) provisions.

EPA Response

Consistent with normal Agency practice, EPA considered, to the maximum extent practicable, all comments submitted after the close of the comment period..

Comment ID 316bNFR.505.002

Subject Matter Code	10.16
	Two Track Process

Author Name Rep. Chris R. Wogan

Organization House of Representatives, Commonwealth of PA

The two-track alternative presented in the NODA is a novel approach. It presents real advantages over the status quo and the approach EPA's proposed on August 10, 2001 (65 Fed. Reg. 49,060). Under the alternative, a developer seeking to build a new facility could pursue one of two tracks. Under the "fast track," the company could choose to commit to meeting highly protective flow and velocity standards or apply one or more highly protective technologies that would provide a level of aquatic resource protection within the same general range. This would satisfy § 316(b) by avoiding adverse environmental impact. Alternatively, the developer could choose to conduct a site-specific study to determine the best technology available (BTA) for minimizing adverse environmental impact for the site.

This approach seems to meld together the desirable elements of current practice while acknowledging the convenience and easing the administration of a technological approach. I believe that many developers in our state will choose the fast track option, where meeting those standards is technically and economically feasible. However, such technology may not be technically/economically feasible or environmentally warranted for some very worthwhile projects. That's when the site-specific approach would need to come into play. Therefore, I believe the "two-track" approach is an appropriate means of preserving this needed flexibility. Moreover, I am pleased to see that the site-specific "two-track" approach described in the NODA would not anticipate that every site or every proposed plant design would require the same type of study or the same level of effort. In fact, it provides some objective criteria by which a state permit writer can reasonably assess whether a site-specific study demonstrates the facility will minimize AEI.

In the past, I have objected to the time consuming nature and the drain on precious state resources engaging in a detailed lengthy review of site-specific evaluations were. At the same time, the two-track alternative balances the need for environmental protection, scientifically defensibility and ease of administration with a flexible regulatory approach in an acceptable manner. I wholeheartedly believe the "two-track" approach is environmentally protective, efficient, and provides appropriate flexibility and should be the model on which the final rule for new facilities is based. Therefore, I urge the EPA to pursue this alternative as the Agency finalizes its rule.

EPA Response

EPA believes that the two-track, performance based approach to implementing section 316(b) of the Clean Water Act will minimize adverse environmental impact by requiring best technology available for cooling water intake structures. See preamble section V for discussions on the basis of today's rule and section VII for discussions on implementation issues.

Comment ID 316bNFR.505.003

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Rep. Chris R. Wogan

Organization House of Representatives, Commonwealth of PA

I recommend the EPA adopt an approach under which intakes that withdraw small volumes or that use less than half of the intake water for cooling purposes be exempted from the rule or subjected to a much less stringent level of controls. To do so would tailor the final regulations to those facilities that are most likely to cause an adverse environmental impact (AEI).

EPA Response

See responses to 316bNFR.501.008 and 210.006.

Comment ID 316bNFR.505.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Rep. Chris R. Wogan

Organization House of Representatives, Commonwealth of PA

I strongly encourage EPA to define AEI in a way that is understandable defensible and considers all types of adverse environmental impacts, including those involving other media (e.g., air emissions, noise, water usage).

To that end, I believe AEI should be defined as "biologically meaningful population and community-level impacts."

EPA Response

See responses to comments 316bNFR.501.003, 316bNFR.067.017, and 316bNFR.067.018.

Comment ID 316bNFR.505.005

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Rep. Chris R. Wogan

Organization House of Representatives, Commonwealth of PA

One option presented in the NODA requests comments on the efficacy of using the language found in § 316(a), which regulates thermal discharges, as guidance for determining AEI. That standard, "assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on that body of water," would be workable and consistent with state goals of ensuring adequate protection to aquatic resources.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.008, and the preamble to the final rule.

Comment ID 316bNFR.505.006

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Rep. Chris R. Wogan

Organization House of Representatives, Commonwealth of PA

The EPA also mentioned it might define AEI as a level of impingement and entrainment that is "recurring and non-trivial." For a variety of reasons, this definition is unacceptable, too broad and vague and would only lead to confusion and debate among stakeholders. Therefore, I cannot support this option.

EPA Response

Please see response to comment 316bNFR.536.013.

Comment ID 316bNFR.505.007

Subject Matter Code	2.1
Clean Water Act Requirements	

Author Name Rep. Chris R. Wogan

Organization House of Representatives, Commonwealth of PA

The management of water resources is primarily the responsibility of state and local governments. I understand the importance of recognizing the need to balance federal authority with a tailored regulatory program that will fit the unique characteristics of our state waters. Pennsylvania must continue to take into account the numerous biological, hydrological, and ecological factors that affect our waters. I feel the two-track decision making process suggested in the NODA strikes that balance of appropriate federal guidance and state decision making authority that would lead to efficient and environmental protective permitting decisions.

EPA Response

EPA agrees with the comment.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Rep. Arthur D. Hershey

On Behalf Of:

House of Representatives,
Commonwealth of PA

Author ID Number:

316bNFR.506

Comment ID 316bNFR.506.001

Subject Matter Code	CP
	Comment Period

Author Name Rep. Arthur D. Hershey

Organization House of Representatives, Commonwealth of PA

The NODA seeks further comment new information the Agency has obtained pertaining to the rule as well as much of the same material presented in the August 10,2000 proposed rule. The Federal Register notice provides only a thirty-day comment period and asks for comment on an array of scientific, biological, engineering, economic, social and environmental concerns affecting the management of state run NPDES programs and the welfare of our residents and the resources on which they derive benefit and recreation. We respectfully request that any additional comments we may choose to file after the June 25, 2001 NODA comment deadline be given due consideration. Below are our comments on only selected critical issues presented in the NODA.

EPA Response

Please see response to comment 316bNFR.505.001.

Comment ID 316bNFR.506.002

Subject Matter Code	10.16
	Two Track Process

Author Name Rep. Arthur D. Hershey

Organization House of Representatives, Commonwealth of PA

The Two-Track alternative presented in the NODA is a novel approach. It presents some real advantages over the status quo and the approach EPA's proposed on August 10, 2001 (65 Fed. Reg. 49,060). Under the alternative as we understand it, a developer seeking to build a. new facility could pursue one of two tracks. Under the "fast track," the company could choose to commit to meeting highly protective flow and velocity standards, or to using one or more highly protective technologies that it would show provide a level of aquatic resource protection within the same general range. Such would satisfy 316(b) by avoiding adverse environmental impact. Alternatively, the developer could choose to conduct a site-specific study to determine the best technology available (BTA) for minimizing adverse environmental impact for the site.

This approach seems to meld together the desirable elements of current practice while acknowledging the convenience and ease of administration of a technology approach. We believe that many developers in our state will choose the fast track option, where meeting those standards is technically and economically feasible. But for some very worthwhile projects such technology may not be technically or economically feasible or environmentally warranted, and the site-specific approach would need to come into play We believe that the Two Track approach is an appropriate means of preserving this needed flexibility.

In this regard, we are particularly pleased to see that the site-specific Track 2 approach described in the NODA would not anticipate that every site or every proposed plant design would require the same type of study or the same level of effort. In fact, Track 2 provides some objective criteria by which a state permit writer can reasonably assess whether a site-specific study demonstrates the facility will minimize AEI. For example, the alternative outlines using biological, locational, design, and operational data from the site in a manner consistent with EPA's Risk Assessment Guidelines.

In summary, I believe the Two Track approach is environmentally protective, efficient, and provides appropriate flexibility, and we support its use for new facilities. We believe the two-track alternative should be the model on which the final rule for new facilities is based.

In the past, we have objected to the time consuming nature and the drain on precious state resources engaging in a detailed lengthy review of site-specific evaluations were. At the same time, the two-track alternative balances the need for environmental protection, scientifically defensibility and ease of administration with a flexible regulatory approach in an acceptable manner. Again, I find value in pursuing this alternative as EPA finalizes its rule.

EPA Response

See response to comment 316bNFR.505.002.

Comment ID 316bNFR.506.003

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Rep. Arthur D. Hershey

Organization House of Representatives, Commonwealth of PA

I recommend that EPA adopt an approach under which intakes that withdraw small volumes or that use less than half of the intake water for cooling purposes be exempted from the rule or subjected to a much less stringent level of controls. To do so would tailor the final regulations to those facilities that are most likely to cause an "adverse environmental impact" (AEI).

EPA Response

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. EPA has amended the proposed definition of cooling water intake structure to specify that, if heated water is needed for a manufacturing process, use of waste heat to heat that process water does not make that process water cooling water. Thus, water that serves as cooling water but is subsequently reused as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage exceeds twenty-five (25) percent. In addition, EPA also has added guidance to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. This guidance provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further clarifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn equals or exceeds 25 percent of the total water withdrawn.

Comment ID 316bNFR.506.004

Author Name	Rep. Arthur D. Hershey
Organization	House of Representatives, Commonwealth of PA

Subject Matter Code 9.4

Adverse Environmental Impact

We strongly encourage EPA to define AEI in a way that is understandable, defensible and considers all types of adverse environmental impacts, including those involving other media (e.g., air emissions, noise, water usage).

To that end, I believe AEI should be defined as biologically meaningful population- and community-level impacts.

EPA Response

See responses to comments 316bNFR.501.003 and 316bNFR.505.004.

Comment ID 316bNFR.506.005

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Rep. Arthur D. Hershey

Organization House of Representatives, Commonwealth of PA

One option presented in the NODA requests comments on the efficacy of using the language found in 316(a), which regulates thermal discharges, as guidance for determining AEI. That standard, "assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on that body of water," would be workable and consistent with state goals of ensuring adequate protection to aquatic resources.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.008, and the preamble to the final rule.

Comment ID 316bNFR.506.006

Author Name	Rep. Arthur D. Hershey
Organization	House of Representatives, Commonwealth of PA

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

EPA mentions that as another option, it might define AEI as a level of impingement and entrainment that is "recurring and non trivial." For a variety of reasons, this definition is unacceptable, too broad and vague and would only lead to confusion and debate among stakeholders. We cannot support this option.

EPA Response

Please see response to comment 316bNFR.536.013.

Comment ID 316bNFR.506.007

Subject Matter Code	2.1
Clean Water Act Requirements	

Author Name Rep. Arthur D. Hershey

Organization House of Representatives, Commonwealth of PA

The management of water resources is primarily the responsibility of State and local governments. I appreciate the opportunity to comment on EPA's proposals for guiding the implementation of Section 316(b) of the Clean Water Act. It is important to recognize the need to balance the need for federal authority with a tailored regulatory program that will fit the unique aspects of our state waters. We must take into account the numerous biological, hydrological, and ecological factors that affect our waters.

The two-track decision making process suggested in the NODA strikes that balance of appropriate federal guidance and state decision making authority that would lead to efficient and environmental protective permitting decisions.

EPA Response

EPA agrees with the comment.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William Creal

On Behalf Of:

State of Michigan, Department of
Environmental Quality

Author ID Number:

316bNFR.507

Comment ID 316bNFR.507.001

Author Name	William Creal
Organization	State of Michigan, Department of Environmental Quality

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Section II D 2 invites further comment on the United States Environmental Protection Agency's (USEPA's) proposed definition of the term "littoral zone." To avoid confusion with the specific definition of "littoral zone" applied explicitly to lakes, the MDEQ supports changing the term "littoral zone" to area of "high potential impact." The MDEQ supports a change in wording for the term "littoral zone" and retention of the definition of the term presented in the proposed rule.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.507.002

Author Name	William Creal
Organization	State of Michigan, Department of Environmental Quality

Subject Matter Code 12.22

Potential for Additional Measures for Unique Situations (Great Lakes)

The position that the Great Lakes should be protected to a greater extent than other lakes and reservoirs is discussed in Section II D 4. The MDEQ supports the requirements for intake structures located in lakes and reservoirs presented in the proposed rule for a general level of protection. If a greater level of protection is required for sensitive areas of the Great Lakes, for example, in the vicinity of a river mouth, additional protective measures would be required by the baseline characterization study or under Sections 125.84(f) and (g) of the proposed rule where the director may/must include more stringent requirements

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.507.003

Author Name	William Creal
Organization	State of Michigan, Department of Environmental Quality

Subject Matter Code 10.011

River/Stream--Proposed Standards

Section II D 5 invites comment regarding the position that the aquatic species predominant in freshwater rivers and streams are generally less susceptible to the impacts of cooling water intake structures. The MDEQ supports maintaining the level of protection presented in the proposed rule for freshwater streams and rivers.

EPA Response

EPA has removed the waterbody classification approach from the final rule and has adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones. See response to comment 316bNFR.500.002.

Another change from the proposal is the requirement for total design intake flow for freshwater rivers and streams. The “or 25 percent of the 7Q10" option has been removed. See response to comment 316bNFR.018.003.

Comment ID 316bNFR.507.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name William Creal

Organization State of Michigan, Department of Environmental Quality

Section II E 2 invites further comment regarding the determination of adverse environmental impact on a waterbody from the operation of cooling water intake structures. The MDEQ reiterates comments submitted previously concerning the term "adverse environmental impact." Whether a population modeling approach or biological assessment and criteria methods are used to determine "adverse environmental impact," the MDEQ supports a precise definition of "adverse environmental impact" that can provide a guideline for regulatory establishments.

EPA Response

EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.). Thus, although EPA agrees that all of the potential types of adverse environmental impact fall within the definition of adverse environmental impact, EPA does not believe that impingement and entrainment should be excluded from the definition of adverse environmental impact. EPA's record documents the amount of impingement and entrainment that may occur if not controlled by providing some historical facility examples and documents the effects of this impingement and entrainment where such information is available (see Section III of the preamble to the final rule and Chapter 11 of the EEA). EPA believes that, especially for the new facility rule, measuring environmental performance in terms of reduction of impingement and entrainment is appropriate because measuring impingement and entrainment is quicker and has a higher degree of certainty than conducting population or ecosystem studies.

As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular

recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

Comment ID 316bNFR.507.005

Subject Matter Code	12.21
Thermal Stratification	

Author Name William Creal

Organization State of Michigan, Department of Environmental Quality

Limitation on altering stratification in lakes and reservoirs is discussed in Section II F 2. The MDEQ agrees with the comment that no alteration of the natural thermal stratification of the waterbody is unachievable; however, the MDEQ supports including the concept of alteration of thermal stratification in the final rule. The MDEQ supports including language such as "the cooling water intake may not unacceptably alter the natural thermal stratification and turnover pattern of the source waterbody as shown by the baseline characterization study."

EPA Response

EPA believes the natural thermal stratification of a lake, if present, influence the physical and chemical cycles of lakes, which, in turn, strongly govern their production, utilization, and decomposition. A facility with a disproportionately large water intake can adversely impact both primary and secondary production. EPA believes the intake capacity standard for lakes and reservoirs is economically practicable and technologically achievable for new facilities, and will result in an acceptable level of source water protection.

While no percentage restriction is included for lakes and reservoirs in today's final rule, new facilities located on a lake or reservoir are required to establish a maximum intake capacity that will not disrupt the natural thermal stratification or turnover pattern of the source waterbody where such stratification or turnover pattern is determined to be beneficial. EPA believes an "across-the-board" limit is unworkable for lakes and reservoirs since the concept of flow is inapplicable to a lake. In addition, EPA believes preserving some degree of the natural thermal stratification, if present, is desirable because of the increased cooling efficiency that can result. The thermal stratification standard, while different from the flow-based standards for estuaries and freshwater rivers, does limit a new facility to an intake capacity that will achieve an acceptable level of protection for the source water.

EPA expects new facilities located on a lake or reservoir to work in conjunction with the permitting authority to correctly determine what constitutes an unacceptable disruption of any natural thermal stratification or turnover pattern.

Comment ID 316bNFR.507.006

Author Name	William Creal
Organization	State of Michigan, Department of Environmental Quality

Subject Matter Code 13.1

Requirement of 0.5 fps

Section Il F 3 invites comment regarding the limitation of intake velocity. The MDEQ supports the intake velocity limit of 0.5 feet per second (ft/s) presented in the proposed rule. The US EPA's compilation of fish swim speed data shows that the 0.5 ft/s limit would protect 96 percent of the tested fish. This level of protection is consistent with the level of protection provided by rules concerning the limits for toxic substances. Cooling water intake structures with velocities greater than 0.5 ft/s should be required to submit a demonstration to request less stringent requirements described in Section 125.85 of the proposed rule.

EPA Response

The information submitted by the commenter supports the approach adopted by EPA for the final rule.

Comment ID 316bNFR.507.007

Author Name	William Creal
Organization	State of Michigan, Department of Environmental Quality

Subject Matter Code 10.16

Two Track Process

Section II H discusses the fast-track alternative approach suggested by the Utility Water Act Group. Under this approach, an applicant for a cooling water intake structure may commit to install highly protective technologies at the outset and in return would be exempt from pre-operational or operational studies. The MDEQ supports the fast-track approach to provide greater protection of aquatic resources. A description of the highly protective intake technologies should be included in the rule to define which technology is appropriate for the fast-track approach.

EPA Response

See response to comment 316bNFR.505.002. EPA explains why it rejects the UWAG approach in the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Richard I. McLean & J. James Dieter

On Behalf Of:

State of MD Dept. of Natural Resources
& Dept. of the Environment

Author ID Number:

316bNFR.508

Comment ID 316bNFR.508.001

Subject Matter Code	6.1
Current Implementation of Sec. 316(b)	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

Maryland has developed and implemented state regulations of cooling water withdrawal and intakes based on scientific and technical knowledge of the factors influencing the type and magnitude of impacts expected to occur, and following a logical conceptual framework.

The general concepts underlying our regulations are as follows:

A. Regulations call for the evaluation of impact to a specified level of biological significance; i.e., representative important species (RIS) and spawning and nursery areas of consequence for the RIS.

B. The consequences of the cooling water withdrawal are evaluated based on the extent to which they impact the viability of the RIS population and/or the ecosystem necessary to support its life history functions. The effect of the cooling water intake itself (i.e., the number of fish impinged or entrained), is not the major focus of our regulations; it is the consequence of that effect to the biological entity of concern, whether at the species or the ecosystem level, that establishes what actions the state will take.

We believe that a sequential approach to impact assessment provides a successful generic approach to address the issues involved. Such an approach includes the following: quantify the effects of the cooling water withdrawal, establish the biological entity at risk, and then assess the significance of the effects for causing adverse harm to the target entity. As a practical matter, the State of Maryland implements procedures for determining the significance of impacts of cooling water withdrawal as outlined below.

Maryland regulations establish procedures for determining adverse environmental impacts due to impingement and entrainment at cooling water intake structures, relative to determination of best technology available (BTA) for minimizing these impacts (Code of Maryland Regulations, 26.08.03.04-05). Impingement losses are determined by estimating the number of each species destroyed by the CWIS and multiplying these numbers by the values for each species listed in the regulations. These values are then adjusted by weighting factors based on the species function, i.e., recreational, commercial, forage. Entrainment losses are more difficult to define; the discharger is required to determine the extent of cooling water entrainment loss on a spawning or nursery area of consequence for Representative Important Species (RIS) as defined in the regulations. The discharger is required to determine if the entrainment loss results in a significant adverse environmental impact, defined as meaning a statistically measurable effect beyond a defined mixing zone. RIS are those species selected by a discharger and approved by the state that exhibit one or more of the following characteristics:

1. Species that are sensitive to adverse harm from operations of the facility (for example, heat-sensitive species);

2. Species that use the local area as spawning or nursery grounds, or both, including those species that migrate past the facility to spawn;

3. Species of commercial or recreational value, or both;

4. Species that are habitat formers and are critical to the functioning of the local ecosystem;

5. Species that are important links in the local food web;

6. Rare, threatened, or endangered species;

7. Potential nuisance organisms likely to be enhanced by plant operations.

Based on long-term monitoring within Maryland's waters of both the effects of power plants and the status of living resources, we believe that Maryland's regulations have been completely adequate-for the protection of our important resources.

EPA Response

EPA has not adopted the Maryland approach for new facilities due to the strong record showing that the requirements of the rule are readily achievable and economically practicable for new facilities and due an objective of establishing a fast and certain path that does not require a great deal of site-specific analysis for new facilities. Today's rule establishes a two track approach where a fast track and a site specific based approach are available for the permit applicant for a new facility. Today's rule will not interfere with the states' authorities under sections 401 and 510 of the CWA. Today's rule establishes performance standards that must be adopted, but it contains flexible approaches for how they may be implemented. See section VII of the preamble for a discussion on implementation issues.

Comment ID 316bNFR.508.002

Subject Matter Code	10.04
Site-specific Permit Flexibility	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

The State of Maryland agrees with many of the arguments for a case-by-case approach to the proposed 316(b) rule, as presented in Section VIII, A.l. of the Preamble. EPA should implement 316(b) on a case-by-case, site specific basis, but could establish specific decision criteria that the Director would have to consider when determining the appropriate BTA for minimizing AEI.

EPA Response

EPA has adopted a two-track Option. Track II allows for analysis on a case-by-case basis as is supported in this comment. Requirements for implementation of the program are specified in Part 125 of the Rule: Criteria and Standards for the National Pollutant Discharge Elimination System, and specifically for Track II in 125.84 (c).

The two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the "fast track" (Track I), or by demonstrating the same level of performance as the Track I requirements under the "demonstration track" (Track II).

The two-track approach was chosen with the goal of providing regulatory certainty and fast permitting for new facilities, and allowing flexibility by including a performance-based alternative on a case-by-case basis. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays.

Under Track I, the capacity of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system and the design through-screen intake velocity is restricted to 0.5 ft/s. The rule also includes requirements that restrict the total quantity of intake in proportion to the mean annual flow of a freshwater river or stream, or the natural thermal stratification or turnover patterns of a lake or reservoir, or to a percentage of the tidal excursions of a tidal river or estuary. In addition, the applicant must select and implement an appropriate design and construction technology for minimizing entrainment and impingement and maximizing impingement survival.

Under Track II, the applicant has the opportunity to demonstrate that alternative technologies will reduce impingement and entrainment to the same level that would be achieved under the Track I technology-based performance requirements for capacity, design velocity, and design and construction when applied to a shoreline intake at the new facility site. Proportional flow requirements also apply under Track II.

EPA also notes that certain facilities following Track II may be able to demonstrate reduction of impingement and entrainment to the same level as would be achieved under Track I using lower-cost

alternative technologies.

Comment ID 316bNFR.508.003

Subject Matter Code	7.51
Facilities Not Covered by Today's Proposal	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

(page 28854)

II. Data Obtained Since the Proposal
A. Regulatory Thresholds

To improve the definition in EPA's proposal (65 FR 49066-49067), EPA requests comment on two alternatives:
New facility intake structures not subject to this rule because of the amount of cooling water they use are not considered cooling water intake structures for regulatory purposes and thus would not be subject to section 316(b) of the CWA; or
New facility intake structures not subject to this rule because of the amount of cooling water they use may be subject to requirements established by permit authorities under CWA section 316(b) on a case-by-case basis.

The second definition above is preferable as it gives the state the option of requiring compliance with 316(b) on a case-by-case basis as needed.

EPA Response

EPA agrees. Section 125.80(c) of the final rule specifically provides that new facilities that do not meet the threshold requirements regarding amount of water withdrawn or percentage of water withdrawn for cooling water purposes in section 125.81(a) must meet requirements determined on a case-by-case, best professional judgment (BPJ) basis.

Comment ID 316bNFR.508.004

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

(Page 28854)

The Agency also is considering State of Maryland regulations for cooling water intake structures (see COMAR 26.08.03, #2-004 in the Docket). These regulations exclude cooling water intake structures withdrawing less than 10 MGD of the volume of water is less than 20 percent of the design stream flow for nontidal waters or less than 20 percent of the annual average net flow past the intake which is available for dilution for tidal waters. EPA intends to consider this new information, as well as the information discussed and included in the record at proposal and any other relevant sources of information, to establish a minimum flow threshold in final regulations.

The State of Maryland developed thresholds below which impacts are assumed to be small enough not to require regulation for BTA. The state defines that threshold (based on facilities and affected waterbodies in the state) as 10,000,000 gallons per day, if that volume of water is less than 20% of the: 1) design stream flow (7Q10) for non-tidal waters (rivers); and 2) the annual average net flow past the point of discharge which is available for dilution for tidal waters. Note that even that exemption takes into account site specificity (i.e., the size of the body from which the water is withdrawn), further emphasizing the need for site specificity of the regulations. However, EPA's proposed rule with a 2 MGD threshold may result in unnecessarily including facilities that nearly certainly would have little or no environmental impacts.

EPA Response

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. At a threshold of 5 MGD, only 40 percent of nonutility facilities would be covered under this rule. Under a threshold of 10 MGD, 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. In addition, the trend in power generation is toward, on a per facility/per unit of output basis, a general reduction in cooling water intake flow levels over time. Combined-cycle gas turbines require less water per unit of electricity generated than coal-fired or nuclear facilities. For example, a 750 MW combined-cycle facility with evaporative cooling towers is estimated to require approximately 7 to 8 MGD and under a 10 MGD threshold would not be subject to this national rule. The Agency believes

that, given the objective of section 316(b), it is undesirable to exclude such a large plant from this rule. As reductions in cooling water intake flow levels occur, the two MGD threshold also ensures that this rule can serve the State, Tribes, and permit applicants by assuring that permits for new facilities comply with 316(b).

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.508.005

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

(Page 28857-28859)

D. New Data and Refinements to the New Facility Framework Based on Waterbody Type

1. Tidal Rivers and Estuaries
2. Littoral Zone
3. Revised definition of estuary and ocean
4. Great Lakes
5. Freshwater Rivers and Streams
6. Exception for Areas Not Designated to Support an Aquatic Lifè Use

Maryland believes that defining environmental impacts and measures to minimize these impacts should not be linked to specific waterbody types, as the definitions for the various waterbody types may be difficult to define and generalize. Site-specific studies would need to be conducted unless the facility owner was willing to install the Best Technology Available to minimize Adverse Environmental Impacts (further defined below).

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.508.006

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

Approaches to minimizing adverse impacts must be based on strong technical data and information. Quantification of the effects of water withdrawal is necessary but not sufficient to determine whether additional measures may be necessary to reduce these effects. As we noted above, the key is whether the effects caused by the water withdrawal have significance to the biological entity of concern. If the effects are not significant, existing structures and operations are sufficient, since there is no truly adverse impact to be minimized. Thus, clearly defining what constitutes “adverse impact” is crucial. Maryland considers all costs to the citizens of the state in making their determinations, including costs to the living resources of the state, as well as economic costs to the utilities, and beyond to the consumers, of measures that could be taken to reduce the effects of water withdrawal. Maryland’s regulations thus balance these considerations so that any measures required of the utilities are commensurate with the estimated significance of the effects being reduced. EPA needs to define Adverse Environmental Impacts and to put this into context with the cost to protect natural resources in development of 316b rules for the nation.

EPA Response

EPA agrees with the commenter and has provided our interpretation of AEI in today's preamble (see section VI.B.2.a). Also, see responses to comments 316bNFR.068.007 and 316bNFR.068.008. The costs and benefits of today's rule are provided in sections VIII and IX, respectively.

Comment ID 316bNFR.508.007

Subject Matter Code	10.0
Best Technology Available	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

Based on extensive research and data, Maryland has determined that the extent of impacts of cooling water intake structures is site specific, as well as the need for and nature of various ameliorating intake technologies. Factors that directly affect the decisions on what constitutes BTA at a particular facility include a determination that there is an impact, the nature of the water body, the design and location of the facility on the water body, and vulnerable life stages of affected species. Our assessments of all affected facilities in Maryland resulted in recommendations that ranged from a determination that the existing intake structure is BTA to recommending technologies such as wedgewire screens, modifications to intake structures, installation of barrier nets, etc. Therefore we believe there is no single technology or suite of technologies that can be applied on a state-wide or national basis. However, we believe it is important to have a consistent national process for identifying BTA at the site-specific level.

EPA Response

EPA disagrees that costs may not be considered in making a technology-based decision. See 316bNFR.206.014. The term "available" implies some consideration of technical and economic "practicality." Seacoast Anti-Pollution League v. Costle, 597 F.2d 306 (1st Cir. 1979). The word minimize also suggests that EPA need not select the option that eliminates AEI. Hudson Riverkeeper Fund, Inc. v. Orange Rockland Util., Inc., 835 F. Supp,. 160, 165-66 (S.D. N.Y. 1993)("best available" does not mean perfect.)

EPA rejects dry cooling as best technology available for a national requirement because the technology of dry cooling carries costs that are sufficient to pose a barrier to entry to the marketplace for some projected new facilities. Dry cooling technology also has some detrimental effect on electricity production by reducing energy efficiency of steam turbines and is not technically feasible for all manufacturing applications. Finally, dry cooling technology may pose unfair competitive disadvantages by region and climate. Further, the two-track option selected is extremely effective at reducing impingement and entrainment, and while the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so at a cost that is more than three times the cost of wet cooling. Therefore, EPA does not find it to represent the "best technology available" for minimizing adverse environmental impact. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling

technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). An application of dry cooling will virtually eliminate use of cooling water and impingement and entrainment, in almost all foreseeable circumstances, would reduce a facility's use of cooling water below the levels that make a facility subject to these national minimum requirements.

Please refer to Sections III and VI. B in the final rule for EPA's description of what constitutes adverse environmental impact under this final rule.

Comment ID 316bNFR.508.008

Subject Matter Code	10.04
Site-specific Permit Flexibility	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

Cumulative effects of impingement and entrainment have been evaluated in Maryland in a limited manner. However, most Maryland facilities are geographically separated and the biological populations exposed to the effects of these widespread plants are most often site specific (e.g., the Potomac River striped bass stock is not affected by the operation of the Calvert Cliffs nuclear power plant which is located on the mainstem of the Chesapeake Bay), with only a few resource stocks expo
sed to impacts from multiple plants. Maryland has tracked cumulative impingement losses across all power plants for some species, such as Atlantic Menhaden (Brevortia tyrannus), that may occur over a wide range of salinity regimes and are thus exposed to the effects of all of the power plants located on tidal waters of the state. These assessments suggest that the cumulative magnitude of impingement is a small fraction of the commercial harvest of the species, and a small fraction of estimates of the amount of the species consumed by predators. On that basis, the state has concluded that the levels of impingement by Maryland's power plants do not represent a significant threat to important resource species in the bay.

If an adverse cumulative impact is suspected or indicated, we recognize that considerable uncertainties may exist in the identification of individual contributors to the problem and the assignment of responsibility for ameliorating these impacts. Our research into this issue (Hochberg et al., 1993) has indicated that the lack of a regional land use or water quality management plan would make it difficult to sort out effects of individual power plants from other influences. In the absence of knowledge about other influences on the receiving water body or ecosystem, any assessment of cumulative impact and the effect of a single action (e.g., discharge permit approval) would be flawed.

With regard to Maryland's experience, cumulative impacts have been temporally addressed implicitly within the State through long-term monitoring of the status of important resource species. None of these diverse monitoring programs have suggested that there is an adverse cumulative impact from the power plants operating in Maryland (Richkus and McLean, 2000; Ringger, 2000).

EPA Response

EPA agrees that impacts from various stressors on fish populations or on overall environmental quality are difficult to "sort out" or isolate. EPA is not limiting Adverse Environmental Impacts to population level impacts. For these reasons, EPA has developed national standards to minimize entrainment and impingement, avoiding defining "Adverse Environmental Impact". For new facilities the newly promulgated national standards are based on available technologies which minimize entrainment and impingement, with a two-track Option.

The two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the "fast track" (Track I), or by demonstrating the same level of performance as the Track I requirements under the

"demonstration track" (Track II).

The new Ruling is site-specific at the facility level by leaving it to each facility which technologies they choose to meet the requirements. Site specific concerns are also addressed at the state level in the requirements that are placed in the permit. Track II allows for a more site-specific analysis.

In addition to impingement and entrainment losses associated with the operation of the cooling water intake structure, EPA is concerned about the cumulative overall degradation of the aquatic environment as a consequence of (1) multiple intake structures operating in the same watershed or in the same or nearby reaches and (2) intakes located within or adjacent to an impaired waterbody. Addressing these concerns is left largely to the State or Permitting Authority. Section 125.84 (d) of the regulation states that " You (the permitee) must comply with any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure or monitoring requirements at a new facility that the Director deems are reasonably necessary to comply with any provision of state law, including compliance with applicable state water quality standards (including designated uses, criteria, and antidegradation requirements).

The requirements of the permitting authority are further stated in Section 125.89 (a)(2): For each subsequent permit renewal, the Director must review the application materials and monitoring data to determine whether additional requirements for design and construction technologies should be included in the permit if they are reasonably necessary to minimize impingement and entrainment as a result of the effects of multiple cooling water intake structures in the same body of water; seasonal variations in the aquatic environment affected by the cooling water intake structures controlled by the permit; or the presence of a regionally important species or threatened or endangered species.

These requirements in the final regulation allow for a site specific determination by the permitting authority of whether cooling water intake structures are having a cumulative impact or are contributing to the non-attainment of water quality standards in the source water body. If a permitting authority believes that the cooling water intake structure(s) are contributing to adverse environmental impact, these requirements allow them to implement additional or more stringent requirements. If they determine they are not contributing they are only required to implement the national minimum standards.

Comment ID 316bNFR.508.009

Subject Matter Code	20.2
Monitoring Requirements	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

Continued or periodic monitoring is required to measure the effectiveness of a given technology's performance. This would normally be required only when a facility was demonstrated to have an adverse impact and a BTA was required to be installed. The performance measures that would be used to measure BTA effectiveness would be site-specific.

EPA Response

EPA has established a technology-based rule. EPA is requiring new facilities to meet the requirements of either Track 1 or Track II of today's final rule and the monitoring is to ensure compliance with the requirements. All facilities are required to monitor impingement and entrainment to measure the effectiveness of the technologies they implement to meet the performance requirements of the rule. The purpose of collecting this data is to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. These data would also be used by the permitting authority in subsequent permit terms to determine whether additional or modified design and construction technologies are reasonably necessary.

Comment ID 316bNFR.508.010

Subject Matter Code	22.1
CWIS Impacts and Benefits	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

The state has responsibilities toward all of its citizens and must be careful in mandating potentially costly impact reduction measures that were not justified by the magnitude of the impacts targeted for reduction. Cost must be taken into account to properly balance conflicting demands on the state's resources (e.g., living resources versus water resources for economic activities).

The State of Maryland uses the equivalent of cost-benefit tests in EPA's terminology. We feel that the cost of implementing BTA should not be "wholly-disproportionate" to the value of the resources lost to impingement or entrainment, as outlined below. We don't believe that it is appropriate to limit the absolute cost per unit reduction in environmental impact (a cost-effectiveness test), or to compare costs with revenues or profits from a facility. We also don't place a limit on the absolute level of cost imposed on a facility, category of facility, or industry. The main focus needs to be on the cost of implementing BTA or some other alternative which protects the resource, relative to the cost to the environment.

It is relatively easy to measure and assign an economic value to impingement losses. Maryland's Cooling Water Intake Structure regulations require each facility to provide this information and further requires facilities to install technologies to minimize impingement based on this value. More specifically, the regulations specify dollar values and weighting factors for calculating the value of impinged aquatic organisms. The regulations also require dischargers to install and operate modifications to mitigate this impingement loss, as long as the additional cost of installation and operations over a 5-year period does not exceed 5 times the estimated annual value of impingement loss.

Economic valuation of entrainment impacts is more difficult. The State of Maryland regulations require the discharger to determine the extent of cooling water intake entrainment loss on what we term a spawning or nursery area of consequence for Representative Important Species. If this loss results in statistically significant adverse environmental impact, the discharger has to install and operate modifications to mitigate entrainment loss. Significant in this case is defined as having a statistically measurable effect beyond the mixing zone. Our agency has extensive experience in the valuation of natural resources as well as uses of these resources by our citizens. We use this experience for recommending appropriate regulatory decisions for cooling water intake structures by reviewing entrainment loss studies, developing models to evaluate the spawning and nursery area of consequence and determining whether there is a significant adverse environmental impact. Examples of entrainment evaluation studies include Polgar et al. (1979) and Summers and: Jacobs (1981).

In Maryland, the level of costs test is applied on a site-specific (facility) basis. This necessarily includes the aquatic habitat immediately surrounding a facility. The costs tests should not apply to a specific utility or firm, to the NERC region or to an industry as a whole. It is possible that a facility could become uneconomic due to a required BTA under the state's regulations. Again, the main focus needs to be on the cost of implementing BTA or some other alternative which protects the resource,

relative to the cost of the environmental impact. However, given the relatively recent movement of EPA to regulation via emissions or effluent trading, it is conceivable that such a concept could be applied to cooling water intakes, allowing facility owners to work cooperatively to establish the most cost-effective means of reducing cumulative impacts to species or ecosystems of concern.

In summary, we believe that cost-benefit assessment has a role in ensuring the wise use of environmental and economic resources.

EPA Response

EPA agrees with many of the points made by the commenter. EPA believes that the two-track approach of the final new facility rule will meet the goals of section 316(b) of the CWA, will reduce implementation burden on the permitting authorities, and will provide facilities with the flexibility to meet the requirements of the rule in a cost-effective manner. However, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule. Under Section 510 of the CWA, nothing precludes a state from requiring more stringent standards, however, they may not adopt less stringent standards than those required under federal law.

Comment ID 316bNFR.508.011

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

We believe that mitigation can play a valuable role in resolution of 316(b) issues on a site-specific basis. We use the term mitigation here to refer to something aside from alternative intake technologies or operating strategies which might be used to minimize or compensate for impacts of cooling water intakes.

Empirical studies of entrainment at Chalk Point (owned originally by Potomac Electric Power Company or PEPCo: now owned by Mirant) indicated the potential for significant losses of forage species (bay anchovy, naked goby, silversides) in the Patuxent River estuary. Such losses can inhibit the successful completion of the life cycles of other important species that use the Patuxent as a spawning and nursery area (MMES 1985). Based on field studies, PEPCo concluded (Loos and Perry, 1989) that the reduction in anchovy recruitment for the Patuxent was 4% and that entrainment mortality could cause a reduction in forage fish biomass of about 3,000 to 15,000 pounds (dry weight). These estimates were based on field measurements of population size in the Patuxent and entrainment by Chalk Point. An independent analysis of the same data lead the State to conclude that loss of bay anchovy in the estuary due to entrainment was approximately 14 to 51% (most probably 20 to 30%) annually (Versar, 1989). PEPCo (1989) calculated the value of the entrainment losses at $150,000 per year (1989 dollars) based on its loss estimates. PEPCo also calculated the cost of BTA alternatives (cooling towers and wedgewire screens) as ranging from $10,000,000 to $288,000,000 (1989 dollars). According to PEPCo, the alternatives evaluated varied in effectiveness in reducing entrainment from almost none to 100%.

Maryland developed a mitigation plan for PEPCo. This plan was based on a number of factors, including the fact that there was a substantial difference between the cost of requiring BTA (such as cooling towers) and the environmental benefits. There was also substantial uncertainty about the magnitude of benefits and the nature of the impacted species, as outlined above. The mitigation plan was implemented by the MDE as a condition of Chalk Point's NPDES discharge permit. It required PEPCo to spend $200,000 per year on striped bass aquiculture or other species as determined by the Maryland Department of Natural Resources (MDNR), and $50,000 per year for aquaculture of yellow perch or other species as agreed upon by MDNR. This permit condition contemplated the production of 200,000 striped bass and 50,000 yellow perch per year. The permit also requires PEPCo to provide $100,000 per year to the state for environmental education or for projects to remove obstructions to anadromous fish. The requirement remained in effect for 7 years. It was based on the estimated present value of the aquatic creatures lost. PEPCo continues to raise fish in its aquculture facility even though the regulatory requirement has been satisfied. They are presently raising shad and sturgeon.

We believe a sound decision was made based on the success of the mitigation program. In this case, this program included creating a fish hatchery for potentially impacted fisheries and provision of funds for removal of obstructions to migratory fishes on tributaries, by removing dams or providing fish passage facilities. Results of the hatchery and stocking program resulted in the production and release of 3.5 million juvenile striped bass to date, the total estimated weight of which exceeded the estimated

weight of forage fish lost from entrainment at Chalk Point. At the end of 1997, 750,000 shad had also been produced, this species is currently the focus of fishery restoration efforts in Maryland. Each of these benefits is directly related to the enhancement of the State's fisheries.

EPA Response

See response to comment 316bNFR.024.007 and the preamble to the final rule.

Comment ID 316bNFR.508.012

Author Name	Richard I. McLean & J. James Dieter
Organization	State of MD Dept. of Natural Resources & Dept. of the Environment

Subject Matter Code 9.4

Adverse Environmental Impact

Adverse Environmental Impact (AEI) is not defined in the rule; EPA's tentative definition in the preamble of an effect on 1% or more of the organisms around the CWIS is too generic. It is essential the AEI be defined on a site-specific basis and relative to its significance to the biological entities of concern.

EPA Response

See preamble section VI.B.2.a. and responses to comments 316bNFR.501.003, 316bNFR.068.007, and 316bNFR.068.008.

Comment ID 316bNFR.508.013

Author Name	Richard I. McLean & J. James Dieter
Organization	State of MD Dept. of Natural Resources & Dept. of the Environment

Subject Matter Code 10.0

Best Technology Available

Best Technology Available (BTA) is not defined; however, there is a requirement for a design intake flow equivalent to closed cycle cooling unless the intake is more than 50 m from a littoral zone. This requirement basically mandates closed-cycle cooling as BTA, based only on proximity to a littoral zone, regardless of the environmental impact on local fish populations. BTA requirements should be made in the context of cost for the technology relative to the environmental benefit.

EPA Response

In the final rule, EPA has interpreted adverse environmental impact. See the preamble to the final rule and subject matter code 9.4 of the comment response document. EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. The concept of the littoral zone delineation has been removed. The regulation is based on BTA which does require that the capacity of the cooling water intake structure be restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays, while also providing for consideration of significant site-specific factors. Track II provides equivalent performance but greater flexibility to address site-specific factors and an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

EPA believes it has set requirements based on available and economically practicable technologies. Furthermore, BTA requirements were considered in the context of cost for the technology relative to the environmental benefit. See Section VIII of today's rule for a summary of BTA cost estimates. Also see the Economic Analysis which supports this rulemaking.

Comment ID 316bNFR.508.014

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Richard I. McLean & J. James Dieter

Organization State of MD Dept. of Natural Resources & Dept. of the Environment

Study Requirements are extensive, including a baseline biological study for at least 1 year, and post-construction monthly impingement monitoring and bi-weekly entrainment monitoring during the spawning period. These studies would be required even if BTA is proposed (defined as using a cooling tower and wedge-wire screens). In some cases, these studies may not be necessary and needlessly restricts states in customizing requirements as appropriate for a specific site.

EPA Response

EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicant must conduct a considerably more rigorous study if they seek to demonstrate that alternatives to the Track I requirements will equivalently reduce impingement and entrainment at a site. This study must demonstrate that alternative technologies will achieve a comparable level of performance with Track I, accounting for all relevant site specific conditions.

Comment ID 316bNFR.508.015

Author Name	Richard I. McLean & J. James Dieter
Organization	State of MD Dept. of Natural Resources & Dept. of the Environment

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

Design Intake Flow minimum is 2 MGD to be included in the rule; there is no technical justification for this threshold. There is also no technical justification for specific maximum flow volumes allowable; these should be determined based on site-specific information.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.508.016

Author Name	Richard I. McLean & J. James Dieter
Organization	State of MD Dept. of Natural Resources & Dept. of the Environment

Subject Matter Code 13.1

Requirement of 0.5 fps

Design Intake Velocity maximum of 0.5 ft/s is not technically justified and could restrict the state's ability to require an intake structure that minimizes AEI.

EPA Response

EPA disagrees with the commenter. See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement. As such, today's rule can not account for every site-specific contingency at any given plant nor the fate of an individual fish. There are several components of the rule that allow States to require additional controls. Under § 125.80(d), § 125.84(e) and § 125.86, the Director may require additional controls to complement the protection afforded by the velocity requirement.

Comment ID 316bNFR.508.017

Author Name	Richard I. McLean & J. James Dieter
Organization	State of MD Dept. of Natural Resources & Dept. of the Environment

Subject Matter Code 9.4

Adverse Environmental Impact

Entrainment and Impingement Impacts are not specifically defined but there is a requirement for littoral zone and estuarine intakes to “implement additional technologies to minimize impingement and entrainment of fish, eggs, and larvae and maximize survival of adult and juvenile fish” This requirement does not take into account that not all parts of estuaries are equally sensitive or productive States should be given the flexibility to allow for compensation to make up for impingement and entrainment losses.

EPA Response

Under Track I of today's rule, there is no distinction among the different waterbody types at which an intake may be sited. Thus, all intakes will be subject to the same technology-based performance standards that seek to minimize entrainment and impingement. Should a facility choose to follow Track II of today's rule, they can show that site-specific conditions and/or applied technologies will allow them to achieve a level of reduction in impingement and entrainment comparable to the same level achieved under Track I. Thus, today's rule provides a flexible option for facilities that do not project high impingement or entrainment losses within their respective waterbodies.

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Susan M. Walthall & Jonathan R. Pawlow

On Behalf Of:

U.S. Small Business Administration

Author ID Number:

316bNFR.509

Comment ID 316bNFR.509.001

Subject Matter Code	23.4
Other Requirements (UMRA, RFA, SBREFA)	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

We provided comments on the proposed rule to EPA on November 9, 2000. We remain concerned that the rule could impose substantial compliance costs on small businesses and other entities, particularly those involved in manufacturing and the co-generation and other power generation sectors, without demonstrated reductions in environmental risks. We are pleased, however, that EPA appears to be looking at a number of issues, some of which are discussed in the NODA, that could, if implemented, go a long ways towards reducing significantly the burdens of the rule on small businesses and other entities while still reducing the risk of adverse environmental impacts from intake structures.

EPA Response

EPA has considered the comment. For a detailed discussion of EPA's position on potential small entity impacts of this final rule, please see the response to comment 316bFNR.012.005 above.

Comment ID 316bNFR.509.002

Author Name Susan M. Walthall & Jonathan R. Pawlow
Organization U.S. Small Business Administration

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The Rule's Proposed Applicability Thresholds Are Not Adequately Supported or Justified by the Scientific Information in the Record and Could Impact a Substantial Number of Small Entities.

We continue to support the approach of applying the new facility cooling water intake structures rule only to facilities that exceed minimum intake flow thresholds, since facilities with larger intake flows are more likely to cause adverse environmental impacts if left unregulated. However, we remain concerned that EPA has not provided an adequate justification for its current choice of thresholds. This is particularly disturbing because the rule's basic 2 million gallons per day ("MGD") applicability threshold could capture many more small businesses than EPA's analyses suggest, including small businesses in sectors not specifically considered by EPA.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA has concluded that the compliance costs for this rule are economically practicable and achievable for the industries affected. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the requirements are technically available.

For further discussion of these points, see Sections VI.A.3., VI.H., and VIII of the preamble to the final rule, and the Economic Analysis.

Comment ID 316bNFR.509.003

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

Subject Matter Code 8.2

Identification of New Manufacturing Facilities

The Agency did not specifically consider the food products, rubber and plastic products, fabricated metal products, and electrical equipment and components manufacturing sectors, each of which contains thousands of small businesses. (See U.S. Census Database for 1997, Employer Firms, Employment and Estimated Receipts by Employment Size of Firm.) Many of the small businesses in these industrial sectors are or could become significant users of cooling water, and therefore could become subject to this rule.

EPA Response

See response to comment 316bNFR.029.002.

Comment ID 316bNFR.509.004

Subject Matter Code	23.4
Other Requirements (UMRA, RFA, SBREFA)	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

The recent shortages in electric power generation capacity and fuel (e.g., gasoline and diesel fuel) supplies in this country could change the outlook for new facilities and trigger the construction of more new power generation and fuel refining facilities than projected by the Agency. A significant number of these new facilities could be developed by small businesses, including small developers of co-generation and other independent power projects and small refiners. Many of these small businesses are or could become significant users of cooling water, some of which could become subject to this rule. Moreover, depending on the economics of the recycling segment of the paper products industry over the next ten to twenty years, a number of new facilities could be built by small businesses. Several of these small businesses could be significant users of cooling water, some of which also could become subject to this rule.

EPA Response

EPA has considered the commenter's argument. EPA's analysis for the final rule is based on the most current data available and uses reasonable forecasts regarding future economic conditions and energy supply. While it is always possible that changing economic conditions could change the outlook for the construction of new facilities, the commenter has provided no evidence to support this claim. Facilities that operate cooling water intake structures subject to this rule tend to be large industrial facilities that are generally not owned by small entities (see also Chapter 3: Profile of the Electric Power Industry and Chapter 4: Profile of Manufacturers in the Economic Analysis document). There is no reason to believe that the recent shortages in electric power generation capacity and fuel cited by the commenter would change this fact.

For a detailed discussion of EPA's position on potential small entity impacts of this final rule, please see the response to comment 316bFNR.012.005 above and Chapter 8: Regulatory Flexibility Analysis in the Economic Analysis document.

Comment ID 316bNFR.509.005

Subject Matter Code	23.4
	Other Requirements (UMRA, RFA, SBREFA)

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

The significant costs associated with complying with the rule could erect a competitive barrier to small business by deterring new small businesses from entering into business activities that would require the use of cooling water in amounts above the thresholds. Alternate sources of water, including from public water systems or groundwater, also frequently are costly and do not provide for small businesses a feasible alternative to the use of surface water sources. In light of the inadequate evidence showing adverse environmental impacts at the low intake flows proposed, discussed in detail in our November 9, 2000 comments, we believe the thresholds can and should be increased to minimize the rule's potential burdens on small business entities.

EPA Response

This comment is identical to comment 316bNFR.029.004 above. See response to comment 316bNFR.029.004.

Comment ID 316bNFR.509.006

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

EPA proposed setting the basic applicability threshold at 2 MGD to ensure that almost all cooling water withdrawn from surface waters nationwide is covered by a national regulation. However, EPA's primary focus for the proposed rule appears to be on regulating major new facilities with substantial cooling water withdrawals. Virtually all of the information on environmental impacts relied on by EPA in the rulemaking materials continues to be associated with major power plants with water intake flows substantially greater than the current 2 MGD size threshold.

We continue to believe the Agency should adjust the rule's basic 2-MGD applicability threshold to at least 10 MGD. Furthermore, based on the information reviewed to date, we believe that a threshold set at 25 MGD for facilities on somewhat larger waterbodies (for example, where intake flows do not exceed 10% of a stream's 7Q10 flow, 10% of the mean annual volume of a lake or reservoir, or 10% of the volume of the water column near an intake in a tidal river or estuary, as proposed by earlier commenters) would be appropriate. A 25 MGD threshold still would cover a very high percentage of total estimated cooling water withdrawal flows. <fn1>

EPA should not set a lower threshold without first substantiating, through sufficient, credible scientific studies and other information, that the risk of adverse environmental impacts is substantial at intake flow levels immediately above the threshold level in question. A threshold should not be set based merely on conjecture, on extrapolations or scaling down from some high flow conditions, or on some other unsubstantiated assumptions.

Footnotes

1 EPA's justification for the 2 MGD threshold in the notice of proposed rulemaking is that it captures 99.97% of all cooling water flows. However, according to the Agency's figures, a 25 MGD threshold is equally supportable, since it captures 99.1% of the flows (less than a 0.9% difference), according to the rule proposal.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

EPA did not select a 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under this threshold and would leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, only 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

No percentage flow threshold has been added to the applicability provisions. The final rule does include proportional flow requirements that have been demonstrated to be achievable at new facilities. For further discussion of these points, see Sections VI.A.3, VI.C, and VI.D of the preamble to the final rule.

Comment ID 316bNFR.509.007

Subject Matter Code	12.31
Request for Comment: Proportional Flow Requirement	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

EPA should not adopt the 1% of mean annual flow or volume threshold it is contemplating because the Agency has provided no evidence that this level is needed to eliminate a problem. On the other hand, if there is evidence that a higher flow or volume threshold would solve a problem, a flow or volume threshold set at the higher level should be considered.

EPA Response

EPA believes it has presented ample evidence demonstrating a significant decrease in the level of impingement and entrainment when intake flow is minimized. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment. EPA believes the intake capacity standard established under today's final rule provides an adequate level of protection and is economically practicable and technically available to all new facilities. See the preamble to the final rule.

Comment ID 316bNFR.509.008

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

EPA should adopt an absolute minimum flow threshold (such as 100,000 gallons/day, or higher, of water used for cooling purposes), in conjunction with the percentage of waterbody flow or volume threshold, to ensure that smaller new facilities located on fairly small waterbodies are not subjected to excessively stringent national standards. Smaller facilities should be addressed on a case-by-case basis, only where needed, with any requirements specifically tailored to reflect site-specific conditions.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold.

EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ.

The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD. No flow threshold has been added to the applicability provisions; proportional flow limits exist in the rule.

For further discussion of these points, see Sections VI.A.3 and VI.D. of the rule.

Comment ID 316bNFR.509.009

Subject Matter Code	7.51
Facilities Not Covered by Today's Proposal	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

New facilities with intake structures not subject to this rule because they fall below the rule's applicability thresholds should not be considered cooling water intake structures for 316 (b) regulatory purposes. Such facilities should not be automatically subjected to case-by-case 316(b) determinations because they presumptively would not pose a substantial risk of adverse environmental impacts. Individualized 316(b) determinations might be considered only in those few instances where there are unique circumstances providing a reasonable basis for a permit authority to conduct an evaluation.

EPA Response

EPA disagrees. Although EPA believes, as set forth in today's final rule, that the amount of water withdrawn constitutes a reasonable basis for differing approaches in implementing 316(b) requirements to new facilities, that is, below 2 MGD a site-specific approach and above 2 MGD a national technology-based standard, EPA does not agree that cooling water intake structures withdrawing less than 2 MGD fall outside any level of evaluation under 316(b). 316(b) of the CWA requires that "Any standard established pursuant to section 1311 of this title or section 1316 of this title and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." EPA does not agree that the statute compels a determination that the cooling water intake structure is causing a population problem before acting, rather it authorizes requiring BTA for minimizing impingement and entrainment. EPA did not have a record to demonstrate what suite of controls are technically available and economically practicable at facilities withdrawing less than 2 MGD but believes that the permit authority should apply the statute on a BPJ basis in those instances. This provision does not establish levels or amounts of cooling water intake withdrawals under which its applicability is suspended. Any new facilities that withdraw less that the thresholds set in today's rule, would still be subject to 316(b) requirements but would be best addressed through a site-specific approach by the permitting authorities. See preamble section VI.A.3 for further discussions on the applicability criteria of today's rule.

The national technology-based performance requirements of the final rule do not apply to facilities with an intake flow less than 2 MGD. However, the final rule does require that these facilities must meet requirements determined on a case-by-case, best professional judgment (BPJ) basis. This provision does not mean that each of these facilities will be required to implement additional technologies beyond that which the facility is planning to install. It merely means the permitting authority must review and consider the impacts of the cooling water intake structure and determine if additional NPDES requirements are needed.

Comment ID 316bNFR.509.010

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

EPA Should Define a Cooling Water Intake Structure Where at Least 50% of the Withdrawn Water is to be Used for Cooling Purposes.

Section 316(b) of the Clean Water Act is aimed at regulating intake structures that withdraw cooling water, not process water. However, EPA currently is proposing to define a cooling water intake structure as any structure where as little as 25% of the withdrawn water is used for cooling purposes. Hence, many facilities, including small businesses, that use surface water predominantly for process purposes would be subjected to the requirements of this rule that is supposed to regulate cooling water intake structures only. The Agency has solicited comment in the NODA on the appropriateness of this 25% threshold figure.

It is not clear what or how much adverse environmental impact associated with cooling water withdrawals would be eliminated by such a standard. However, it is clear that this standard could affect a significant number of small businesses. Again, this threshold figure appears to be set specifically to capture a significant number of facilities by the rule, rather than to focus on eliminating demonstrable environmental harm.

We continue to believe EPA should define a cooling water intake structure as it did in the Agency's 1976 final rule and 1977 guidance, where at least 50% of the withdrawn water is to be used for cooling purposes. A 50% threshold would be more consistent with the jurisdictional basis and purpose of § 316(b), namely, regulating cooling (not process) water intakes. Furthermore, a 50% threshold still would capture half of the manufacturing facilities, based on an extrapolation of the Agency's preliminary data from the existing facilities questionnaire, and still would capture a substantial majority of all cooling water flows.<fn2>

Footnotes

2 It is anticipated the estimated half of manufacturing facilities that would be removed from coverage by the rule with a 50% threshold would account for considerably less than half of the total cooling water withdrawal flows from manufacturers. (The Agency should confirm this figure in the questionnaire database.) Moreover, according to figures used by the Agency, manufacturing accounts for less than 10% of total cooling water withdrawal flows. Based on the foregoing, a 50% threshold would remove only a small percentage of cooling water flows from regulation, and the vast majority of cooling water flows would remain regulated.

EPA Response

See response to 316bNFR.029.010.

Comment ID 316bNFR.509.011

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

The Percentage Use Threshold Should Exclude Withdrawn Water Used for Both Process and Cooling Purposes.

Many facilities use withdrawn water in varying proportions over time for process versus cooling purposes. Furthermore, industrial facilities often preheat process water with energy captured from operations inside the facility. A common way of doing this is to run the water through a steam condenser to transfer heat to the water and then use it for other for process purposes. Moreover, some facilities use process water to perform subsequent cooling functions. Such practices conserve both water and energy. If such uses of water would constitute a "cooling water" function for purposes of applicability of the § 316(b) standards, then in some cases facilities would be compelled to cease these practices, with substantial adverse environmental and energy consequences.

For example, industrial facilities would need to separate their cooling water from their process water to meet the standards for cooling water intake structures, with the result that they would lose the benefit of recovering waste heat for process purposes. Moreover, the lost heat that was going into the process water use would result in the increased burning of fossil fuels to make up for the additional heat required. This burning of additional fossil fuels would result in other adverse environmental impacts such as higher air pollutant emissions and creation of greenhouse gases. It also would adversely affect energy resources and use by forcing small businesses and other entities to incur the cost of using additional expensive energy resources unnecessarily. These unintended consequences to the environment and energy resources are negative and should be considered in the evaluation of adverse environmental and energy impacts under this rule.

It is unclear how the rule's percentage use threshold would be applied at facilities where intake water is used in varying proportions over time for cooling versus process purposes, or where water may be used initially as cooling water and subsequently reused as process water in the plant. It is also unclear how the percentage use threshold would be applied at facilities that use withdrawn water only intermittently for cooling purposes (e.g., for makeup water).

EPA needs to clarify how the percentage use threshold would be applied at facilities which use withdrawn water in varying proportions over time for process versus cooling purposes. The percentage of use should be defined in terms of a long term average use at the facility, for example, an annual average. Where water is used initially as cooling water and subsequently reused as process water in the plant, or vice versa, such water should be excluded from the definition of cooling water, since it also serves a "process water" function. Moreover, water used both as cooling water and process water in the plant should not be counted against the minimum flow threshold (discussed above in Comment 1), but should be subtracted out of the plant's total intake flow for purposes of determining applicability of such threshold to the plant.

The Agency should encourage facilities to reuse water, because of the environmental and energy advantages of reusing such water and capturing what would otherwise, in many instances, be wasted

energy.

EPA Response

The final rule provides that the flow reduction requirement can be met by reusing or recycling water withdrawn for cooling purposes in subsequent industrial processes. The rule also provides that a new facility meets the 25 percent cooling water threshold if, based on the new facility's design, any monthly average over a year for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

Comment ID 316bNFR.509.012

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

EPA Needs to Provide a Reasonable Definition of "Adverse Environmental Impact" in the Rule.

The proposed rule does not define "adverse environmental impact" ("AEI"). As a result, it is impossible to evaluate whether the technology-based approach proposed by the Agency in the rule would minimize AEI at new facilities. However, we applaud EPA's apparent efforts, as discussed in the NODA, to develop a realistic and reasonable definition of AEI.

A reasonable definition of AEI needs to be provided in the rule so that there is a definitive endpoint for determining the efficacy of proposed requirements. Adverse environmental impact should take into account effects on the entire population of the aquatic community, and consider seasonal and natural variability and other appropriate site-specific conditions.

EPA Response

See response to Comment 316bNFR.501.003.

Comment ID 316bNFR.509.013

Subject Matter Code	10.16
	Two Track Process

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

Facilities Should Be Given the Option of a "Two-Track Approach."

We support, in principle, a two-track approach along the lines of the proposal provided by the Utility Water Act Group. This approach would allow regulated entities to agree to either (i) a set of specified controls in exchange for certainty of getting § 316(b) approval ("Track 1," a so-called "fast-track" alternative), or (ii) demonstrating, through site-specific studies, that their intakes are not causing AEI, potentially leading to a less stringent set of requirements ("Track 2").

A regulatory approach like this could provide flexibility to regulated entities. The controls to be specified under the "fast-track" alternative need to be protective, yet set at a sufficiently reasonable level, to make this a realistic alternative. It also should free a facility up from having to conduct potentially very time-consuming and costly site-specific environmental impact studies. Similarly, the site-specific studies that would be required under the second alternative would need to be sufficiently reasonable, to make this a realistic alternative as well.

EPA Response

EPA believes the performance standards, both under Track I and Track II are reasonable, affordable and achievable. (see preamble sections V and VIII as well as supporting document entitled: Economic Analysis of the Final Regulations Addressing Cooling Water Intake Structures for New Facilities). EPA believes that commenter's concerns are sufficiently addressed in today's final rule because an expeditious and streamlined approach (Track I) is available where no time-consuming studies are required; as well as a site-specific, alternative option is available where both alternative and innovative technologies may be employed and still accomplish the goals of the Clean Water Act. EPA explains why it rejects the UWAG approach in the preamble to the final rule.

Comment ID 316bNFR.509.014

Author Name Susan M. Walthall & Jonathan R. Pawlow
Organization U.S. Small Business Administration

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

We believe it is appropriate for the Agency to provide minimum intake flow thresholds in the rule. If appropriately established, thresholds could provide significant relief for small businesses and other entities while also being protective of the environment. The thresholds as currently contemplated, however, are not supported or justified by the scientific information on which the Agency is proposing to base the rule, and thus could impose substantial compliance costs on entities without any demonstrable evidence of environmental risk. EPA should consider increasing the basic threshold to at least 10 MGD, with a threshold set at 25 MGD for facilities on somewhat larger waterbodies.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under this threshold and would leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, only 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards

EPA has concluded that the compliance costs for this rule are economically practicable and achievable for the industries affected. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds the cost to be economically practicable and the

requirements are technically available. The Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

Comment ID 316bNFR.509.015

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

The Agency also should consider setting a flow or volume threshold at an appropriate level only if there is evidence that a flow or volume threshold would solve a problem.

EPA Response

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

Comment ID 316bNFR.509.016

Subject Matter Code 7.2

Definition: Cooling Water Intake Structure

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

At least 50% of the intake water flow should be for cooling purposes. Such thresholds are more in line with the available scientific information.

EPA Response

See response to 316bNFR.029.010.

Comment ID 316bNFR.509.017

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name Susan M. Walthall & Jonathan R. Pawlow

Organization U.S. Small Business Administration

EPA needs to consider the environmental and energy implications of the standards and technologies the Agency selects for the final rule. Certain technologies and requirements under consideration could require significant energy consumption, and also result in higher air pollutant emissions and creation of greenhouse gases.

EPA Response

See responses to comments 316bNFR.068.100 and 316bNFR.014.019.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Roger E. Claff

On Behalf Of:

American Petroleum Institute

Author ID Number:

316bNFR.510

Comment ID 316bNFR.510.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Roger E. Claff

Organization American Petroleum Institute

Although the NODA only addresses new facilities, EPA will surely consider many of the underlying principles of the regulation in the upcoming rulemakings for existing facilities. We appreciate that the Agency has clearly stated that requirements for existing facilities must be different from those for new facilities, as retrofitting and/or intake relocation may be cost prohibitive or even impossible. Nevertheless, we are concerned about the implications of this rule to the scope of the upcoming proposed rules for existing facilities, given that many of the underlying assumptions and requirements of the new source proposed rule are either flawed or inappropriate for any facility, whether new or existing.

EPA Response

Today's final rule applies only to new facilities. EPA will address existing facilities in Phase II of this rulemaking.

Comment ID 316bNFR.510.002

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Roger E. Claff

Organization American Petroleum Institute

The definition of a cooling water intake should be based on the condition that more than 50% of the water withdrawn is used for cooling.

EPA requested comments on the preliminary data the Agency recently gathered from its detailed questionnaire for existing facilities in regard to defining a "cooling water intake structure." A plain reading of Section 316(b) of the Clean Water Act states that "Any standard ... shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." Section 316(b) clearly applies only to cooling water intake structures, not all water intake structures. A reasonable definition of a cooling water intake structure is a structure that withdraws water predominantly for cooling purposes; in other words, a structure for which more than half of the water intake is used for cooling.

Such a definition, which is fully consistent with the plain wording of Section 316(b), applies independent of the number of facilities potentially covered by the regulation. Maximizing the number of facilities covered by the regulation is an inappropriate criterion for determining the definition of a cooling water intake structure. For example, it should be irrelevant to the rulemaking that the data summary shows that those intake structures with withdrawal volumes made up of more than 50% cooling water would cover 49% of the manufacturing facilities. The objective is not covering 100% of all water intake structures. The objective is implementing best technology available to minimize environmental impacts of cooling water intake structures only.

In the proposed rule for new sources, EPA properly defines a cooling water intake as a surface water withdrawal where at least 50% of the water is used for cooling, 65 FR 49067. If this definition is to be revised, the Agency should provide a data analysis demonstrating the need to extend this regulation to facilities whose intake water usage is primarily for purposes other than cooling. The data we have seen do not support this extension, nor do the legal arguments presented.

EPA Response

EPA believes it is appropriate to apply the rule requirements to those that use 25 percent or more of their water for cooling because the requirements are based on technologies that are technically available, practicable, and acceptable non-water quality environmental impacts.

EPA has removed the twenty-five (25) percent threshold from the definition of a clean water intake structure and placed the threshold in the applicability requirements of the final rule. EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other

thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.510.003

Subject Matter Code	7.1
Definition: New Facility	

Author Name Roger E. Claff

Organization American Petroleum Institute

New intake structures not subject to the rule because of the amount of cooling water they use should not be considered cooling water intake structures and thus not be subject to 316(b) of the Clean Water Act.

EPA asks for comments on two alternatives associated with the definition in EPA's proposed rule for new facilities, 65 FR 49066-49067. Again, Section 316(b) of the Clean Water Act clearly pertains only to cooling water intake structures. There is no logical legal basis to support the extension of cooling water intake structure rules to structures that withdraw water predominantly for purposes other than cooling, even on the "case-by-case basis" mentioned as an alternative in the NODA. Non-cooling water intake structures simply are not addressed under Section 316(b), and hence cannot be addressed by the rulemaking covered by the NODA.

EPA Response

EPA believes it has broad discretion to regulate water withdrawn for cooling purposes under the plain language of section 316(b). See, United States Steel Corp., v. Train, 556 F.2d 822, 849-850 (7th Cir. 1977) (In rejecting argument that 316(b) applies only to steam electric generating plants, "EPA, which is the agency charged with enforcing this statute, construes sec. 316(b) to apply to all point sources. That interpretation of the statute comports with its plain meaning and we accept it." "…as sec. 316(b) itself makes clear, these requirements are to be implemented through standards established pursuant to secs. 301 and 306"). EPA has used this threshold in order to implement sec. 316(b) for as many facilities it can address on a national basis as BTA for minimizing adverse environmental impact in order to provide regulatory certainty to new facilities and facilitate permitting for new facilities.

In the final rule EPA has placed the 25 percent threshold and the 2 MGD threshold in the applicability requirements of the rule to clarify the applicability of the rule and to ensure that the permit authority may have the discretion to regulate a cooling water intake structure that falls below that threshold on a case-by-case basis, using Best Professional Judgment. Although cooling water intake structures that fall below this threshold are not subject to the final national rule, EPA does not want to inhibit the ability of permit writers at the Federal, State, or Tribal level to address such cooling water intake structures as deemed necessary. In those cases where this rule does not apply because the cooling water withdrawal does not meet the twenty-five (25) percent or 2 MGD threshold, then Federal permit writers may regulate these new facilities using best professional judgment as appropriate.

Comment ID 316bNFR.510.004

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Roger E. Claff

Organization American Petroleum Institute

The intake flow threshold for application of these rules should be greater than 100 MGD. The proposed threshold of a mere two million gallons per day is not supported by any technical or scientific analysis demonstrating adverse environmental impacts at such a low flows.

The NODA discusses EPA's proposal that the technology requirements of the proposed rule would apply to all new cooling water intake structures with design flows of 2 million gallons per day (MGD) or greater. The specific language of Section 316(b), however, requires EPA to develop technologies for cooling water intakes to minimize adverse environmental impacts As discussion on this subject continues, it is becoming clearer that no data or analyses exist that demonstrate cooling water intakes with design flows less than 100 MGD cause adverse impacts.

The NODA implies that the application threshold should be based on the percentage of facilities that are covered. The conclusion that 97.3% of cooling water flows would be covered at 2 MGD, however, is irrelevant to the intent of Section 316(b). Only those cooling water intake structure flows that create adverse environmental impacts need to be covered by this rulemaking. Regulation of additional facilities with such low intake flows is contrary to the intent of the statute, will be extremely burdensome and costly, and will result in negligible incremental environmental benefit.

In the preamble of the proposed rule, EPA concedes that there is very little information on entrainment and impingement impacts for intake water flows less than 100 MGD (65 FR 49068). In the preamble, all of EPA's examples of cooling water intakes causing documented impacts on aquatic populations are for facilities with intake flows of greater than 100 MGD (65 FR 49073). Two entrainment/impingement studies at lower flows are cited, one at 20 MGD in Michigan and another at 4.2 MGD in New York. There is no indication, however, that either of these studies documented adverse environmental impacts resulting from these cooling water intakes.

API reviewed the 1998 and 1996 EPA National Water Quality Inventory reports (EPA841S-00-001 and EPA84I -R97-008, respectively) to determine if any states had specifically identified entrainment and impingement as sources or stressors leading to impaired aquatic life uses. None of the states, nor EPA, identified entrainment and impingement of aquatic life by cooling water intakes as a source or cause of impairment in rivers/streams, lakes, estuaries, or oceans. The absence of such designations supports the conclusion that significant adverse environmental impacts due to cooling water intakes are rare and highly site specific.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA

estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. For example, a threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities who could technically achieve and economically afford the requirements of the rule would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

Finally, with regard to the 305(b) reports, under current requirements there is neither sufficient data nor standards to identify cooling water intake structures as distinct causes of water quality impairment. Intakes pose different issues than the discharge of pollutants. In the 305(b) reports, impairment is typically identified by comparing ambient water quality data with water quality standards. There are no water quality standards that address intake issues such as impairment and entrainment.

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.510.005

Subject Matter Code	12.22
Potential for Additional Measures for Unique Situations (Great Lakes)	

Author Name Roger E. Claff

Organization American Petroleum Institute

The Great Lakes will be provided adequate protection under the cooling water intake structure provisions and do not require protection beyond those proposed for lakes and reservoirs.

In the NODA, EPA requests comment on the position that the Great Lakes should be protected to a greater extent than other lakes and reservoirs. But there is nothing to indicate that protection from adverse environmental impacts from cooling water intake structures is required beyond that to be provided by the anticipated rulemaking for lakes and reservoirs.

A review of the report, entitled "The Conservation of Biological Diversity in the Great Lakes Ecosystem: Issues and Opportunities" (Docket citation 2-016B), certainly describes how unique the Great Lakes are in many ways. The discussion of environmental stresses on the Lakes, however, does not even mention intake structures or water intakes. In fact, none of the stressors reported to have the greatest impacts on biological diversity in the Great Lakes is related to the cooling water intake structures being addressed in the lakes and reservoirs rulemaking. Rather, these stressors are habitat destruction, and alteration of physical processes such as lake-level dynamics, stream flows affecting tributaries to the Lakes, and groundwater regimes. Altered species interactions, particularly competition pressures from exotic species, also emerged as important stresses.

There is no documented or supported technical basis for imposing in the Great Lakes more stringent cooling water intake structure requirements than the "best technology available," which is required everywhere. In fact, EPA should consider more relaxed requirements, given the enormous volumes of water stored in the Lakes, the existence of large populations of organisms, and the alternatives available for aquatic organisms to avoid intake structures at a single site. This argument holds for any large body of water.

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.510.006

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Roger E. Claff

Organization American Petroleum Institute

"Adverse environmental impact" must be defined based on effects on aquatic communities, not effects on individual organisms:

The NODA says that EPA is planning on assessing the merits of using a population modeling approach to define adverse environmental impact. API strongly supports this approach.

In particular, we support the series of comments of Utility Water Act Group and the Electric Power Research Institute referenced in the NODA. Most compelling is the comment that a site has never been identified where definitive or conclusive population or community level impacts have occurred from operation of cooling water intake structures.

EPA should seriously consider the comments that even entrainment of very large numbers of eggs, larvae, and early juvenile-stage fish does not necessarily meaningfully affect populations of the entrained species and that substantial percentages of the organisms of many species can and do survive entrainment. Further, the comments explain how impingement survival is high for many species and that impingement often tends to predominantly impact common forage species naturally prone to seasonal die-off regardless of the presence or absence cooling intake structures.

The purpose of environmental laws and regulations is to protect people, species, and natural resources, but not necessarily individual organisms. In the absence of adverse effects to species or local populations of organisms, regulations targeted at protection of individual organisms are unduly stringent and costly. Consistent with this reasonable purpose and intent, adverse environmental impact attributable to intake structuresdoes not mean the loss of an individual fish or organism in the absence of a demonstrated impact on the population of these organisms. We urge EPA to first provide a sound definition of adverse impact based on effects to populations of organisms. EPA should then to develop and propose reasonable, achievable technology-based cooling water intake structure guidelines that address the adverse impacts so defined.

EPA Response

EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and

recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.). Thus, although EPA agrees that all of the potential types of adverse environmental impact fall within the definition of adverse environmental impact, EPA does not believe that impingement and entrainment should be excluded from the definition of adverse environmental impact. EPA's record documents the amount of impingement and entrainment that may occur if not controlled by providing some historical facility examples and documents the effects of this impingement and entrainment where such information is available (see Section III of the preamble to the final rule and Chapter 11 of the EEA). EPA believes that, especially for the new facility rule, measuring environmental performance in terms of reduction of impingement and entrainment is appropriate because measuring impingement and entrainment is quicker and has a higher degree of certainty than conducting population or ecosystem studies.

As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

EPA has several concerns pertaining to the definition of AEI proposed by industry: (1) EPA is concerned about the level of uncertainty and subjectivity associated with identification of "representative indicator species," determining sustainability thresholds for multiple populations (see preamble section VI.B.2.c), and assessing whether or not a population is performing its normal ecological function; (2) EPA believes that managing commercial and recreational harvests does not fall within the Agency's regulatory authority; and (3) EPA believes that most aquatic organisms are subjected to multiple anthropogenic stresses and therefore it can be difficult to establish a nexus between one particular stressor and adverse environmental impact with a high degree of certainty (see preamble section VI.B.3).

Comment ID 316bNFR.510.007

Subject Matter Code MISC

Miscellaneous Comment

Author Name Roger E. Claff

Organization American Petroleum Institute

Applicability to OffshoreOil and Gas Exploration and Production Operations

Concerning the applicability of proposed cooling water intake regulations to offshore oil and gas exploration and production operations, we concur entirely with the comments of the Offshore Operators Committee (OOC). See the OOC's comment letter on this NODA [see 316bNFR.503], submitted separately, for detailed comments. In particular, we underscore the following points raised by the OOC in its comments:

* The proposed rule failed to consider offshore oil and gas facilities in the cost/benefit analysis although the economic impact could be large, as offshore and coastal oil and gas drilling facilities have limited technology options owing to space limitations;

* EPA did not consider the impact to existing mobile drilling units that could be considered new sources when drilling development wells;

* EPA has not shown any adverse impacts to the marine or coastal environment arising from the operation of cooling water intakes on offshore platforms and drilling rigs; and,

* EPA did not consider that cooling water intake velocities higher than the proposed 0.5 ft/s limit are necessary in the offshore environment to prevent biofouling;

EPA should specifically exclude offshore oil and gas facilities and mobile drilling units from the proposed rule, and from the existing source rules yet to be proposed, unless EPA can document adverse environmental impacts attributable to operation of cooling water intakes at these facilities. As an alternative, EPA could set an intake design flow threshold of 25 MGD for these facilities, with a minimum of 50 percent of the flow used for cooling purposes.

EPA Response

See response to comment 316bNFR.022.002 and 316bNFR.022.007.

Comment ID 316bNFR.510.008

Subject Matter Code OPP

General Statement of Opposition

Author Name Roger E. Claff

Organization American Petroleum Institute

The proposed rule for new faculties contains far too many onerous, highly prescriptive requirements not justified by EPA's own supporting data and evaluations. Moreover, these proposed requirements are to be imposed on all facilities, regardless of site-specific considerations or circumstances.

EPA Response

See response to comment no. 316bNFR.069.002.

Comment ID 316bNFR.510.009

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Roger E. Claff

Organization American Petroleum Institute

Adverse environmental impact must be defined.

EPA Response

See response to comment 316bNFR.507.004.

Comment ID 316bNFR.510.010

Author Name Roger E. Claff

Organization American Petroleum Institute

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

Intake flow thresholds for applicability of this rule should be based ,on documented adverse impacts to populations of organisms, and so should be on the order of 100 MGD, considerably higher than the currently proposed 2 MGD threshold.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. For example, at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ.

Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.510.011

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Roger E. Claff

Organization American Petroleum Institute

Cooling water intake impacts are site-specific, and so should be regulated on a site-specific basis under this rule.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.510.012

Subject Matter Code MISC

Miscellaneous Comment

Author Name Roger E. Claff

Organization American Petroleum Institute

The unique issues of offshore oil and gas exploration and production operations must be considered in establishing applicability criteria for new and existing sources.

EPA Response

See response to comment 316bNFR.022.002.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Frederick A. Marrocco

On Behalf Of:

Pennsylvania Dept. of Enviromental
Protection (PA DEP)

Author ID Number:

316bNFR.511

Comment ID 316bNFR.511.001

Subject Matter Code	CP
Comment Period	

Author Name Frederick A. Marrocco

Organization Pennsylvania Dept. of Enviromental Protection (PA DEP)

The EPA seeks further comment on new information the Agency has obtained since the August 10, 2000 proposed rule to implement §316(b) of the Clean Water Act for cooling water intake structures at new facilities, as well as much of the same material presented in the proposed rule. The Federal Register notice provides only a thirty-day comment period and asks for comment on an array of scientific, biological, engineering, economic, social and environmental concerns affecting the management of state run NPDES programs and the welfare of our residents and the resources on which they derive benefit and recreation. We respectfully request that any additional comments we may choose to file after the June 25, 2001 NODA comment deadline be given due consideration. But in the interest of time, below are our comments on only selected critical issues presented in the NODA.

EPA Response

Please see response to comment 316bNFR.505.001.

Comment ID 316bNFR.511.002

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Frederick A. Marrocco

Organization Pennsylvania Dept. of Enviromental Protection (PA DEP)

The PA DEP supports the EPA's use of "25% of the intake flow for cooling water use" as a screening tool or threshold to identify "new facilities" as subject to the proposed rule.

EPA Response

No response necessary.

Comment ID 316bNFR.511.003

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Frederick A. Marrocco

Organization Pennsylvania Dept. of Enviromental Protection (PA DEP)

PA DEP would support the second alternative offered to improve the definition in the NODA as follows:

"New facility intake structures not subject to this rule, because of the amount of cooling water they use, may be subject to requirements established by permit authorities under CWA section 316(b) on a case-by-case basis."

EPA Response

EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.511.004

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Frederick A. Marrocco

Organization Pennsylvania Dept. of Enviromental Protection (PA DEP)

PA DEP could also support the EPA's consideration of using the State of Maryland's regulations for identifying thresholds for "new facilities" for cooling water intake structures as discussed in the NODA. Based on either alternative, it is important that provisions allow for exempt facilities to be subject to requirements by permit authorities under CWA section 316(b) on a case-by-case basis if adverse environmental impacts are suspected and/or identified.

EPA Response

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. At a threshold of 5 MGD, only 40 percent of nonutility facilities would be covered under this rule. Under a threshold of 10 MGD, 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 of the rule.

Comment ID 316bNFR.511.005

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Frederick A. Marrocco

Organization Pennsylvania Dept. of Enviromental Protection (PA DEP)

PA DEP generally supports using a biological assessment approach to determining the ecological and/or community/populational impacts that may be related to adverse environmental impacts (AEI) associated with the impingement and/or entrainment by a cooling water intake structure. This follows the approach PA DEP uses in assessing AEI of thermal discharges under section 316(a) of the CWA. The section 316(a) provisions are intended to "assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on that body of water;" and would be workable and consistent with federal and state goals of ensuring adequate protection to aquatic resources. PA DEP, however, fully recognizes that determining the potential AEI that may be attributed to the cooling water intake structure is difficult, especially in complex situations where multiple stressors may compound the observed impacts. Therefore, PA DEP would request that we remain party to EPA's on-going considerations of the definition and related methods that will identify what is considered as AEI under this rule.

EPA Response

Under today's rule, EPA rejected the biological assessment approach as a means for defining AEI (please see section VI.B.2.d of the preamble for today's rule).

Please see responses to comments 316bNFR.008.006 and 316bNFR.068.008 for EPA's interpretation of AEI for the purposes of today's new facility rule.

Comment ID 316bNFR.511.006

Author Name	Frederick A. Marrocco
Organization	Pennsylvania Dept. of Enviromental Protection (PA DEP)

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

We strongly encourage EPA to define AEI in a way that is understandable, defensible and considers all types of adverse environmental impacts, including those involving possible transfer to other media (e.g., air emissions, noise, water usage).

EPA Response

For a discussion of the definition of AEI see response to comment 316bNFR.029.013. For discussion of non-aquatic environmental impact, see responses to comments 316bNFR.014.019 and 316bNFR.068.100.

Comment ID 316bNFR.511.007

Author Name	Frederick A. Marrocco
Organization	Pennsylvania Dept. of Enviromental Protection (PA DEP)

Subject Matter Code 10.16

Two Track Process

Under the Two-Track alternative, as described in the NODA, a developer seeking to build a new facility could pursue one of two tracks. Under the "fast track," the company could choose to commit to meeting one or more of a number of specified technologies deemed to represent highly protective flow and velocity standards,or technologies; or alternatively, the developer could choose to conduct a site-specific study to determine the best technology available (BTA) for minimizing adverse environmental impact for the site.

PA DEP generally agrees that by using one or more highly protective technologies, intake designs and velocity criteria that the developer could show that the combined suite would provide a level of aquatic resource protection to satisfy §316(b) requirements by generally avoiding adverse environmental impact.

PA DEP finds value in pursuing this alternative as EPA finalizes its rule, and believes the Two Track approach can be environmentally protective, efficient, and can provide appropriate flexibility when considering section 316(b) requirements for new facilities.

EPA Response

See response to comment 316bNFR.505.002.

Comment ID 316bNFR.511.008

Author Name	Frederick A. Marrocco
Organization	Pennsylvania Dept. of Enviromental Protection (PA DEP)

Subject Matter Code 2.1

Clean Water Act Requirements

We appreciate the opportunity to comment on EPA's proposals for guiding the implementation of Section 316(b) of the Clean Water Act. It is important to balance the need for federal authority with a tailored regulatory program that will fit the unique aspects of our state waters. We must take into account the numerous biological, hydrological, and ecological factors that affect our waters.

EPA Response

EPA describes the rationale for selecting the approach of the final rule in the preamble to the final rule. EPA believes the final rule strikes the right balance between the need for certainty for the regulated community and the states, especially for new facilities, with some flexibility where performance in terms of reduction in impingement mortality and entrainment is comparable to that achieved by meeting track 1 requirements.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Donald Neal

On Behalf Of:

Calpine Eastern Corporation

Author ID Number:

316bNFR.512

Comment ID 316bNFR.512.001

Subject Matter Code OPP

General Statement of Opposition

Author Name Donald Neal

Organization Calpine Eastern Corporation

Calpine submits the following comments in response to the NODA. With very few exceptions that are clearly delineated below, Calpine reasserts the positions identified in its November 9, 2000 comments, and requests that the Agency review those comments as if resubmitted in full in these comments.

EPA Response

EPA has responded to all comments submitted in response to both the proposal and the NODA.

Comment ID 316bNFR.512.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Donald Neal

Organization Calpine Eastern Corporation

The electricity generation industry is undergoing a period of unprecedented growth and competition. The Energy Policy Act of 1992 has opened access to transmission systems and fostered deregulation. Competition not only is leading to cheaper rates, it also is making the generation of electricity more efficient and environmentally-protective. This trend includes improved technologies for cooling water intake systems for new facilities.

EPA's proposed rule governing cooling water intake structures for new facilities has the potential to cause a significant adverse impact to Calpine's future power project development program. If EPA determines that new national regulations are warranted, such regulations first ought to be required for older existing structures, which EPA already has determined may cause more significant environmental impacts than new intake structures. If new facilities must be further regulated by this rulemaking, EPA must alter significantly its proposal in order not to have deleterious impacts on new, environmentally-friendly electricity generation facilities.

EPA Response

Please see response to comment 316bNFR.202.031.

Comment ID 316bNFR.512.003

Subject Matter Code	23.6
Conflict with Administration's New Energy Initiative	

Author Name Donald Neal

Organization Calpine Eastern Corporation

Between the time Calpine submitted its comments last November and EPA's NODA, several overarching developments have further raised the importance of EPA's decision regarding cooling water intake structures and our nation's determination to produce more energy more efficiently, while at the same time protecting the environment. On May 17, 2001, President Bush released a national energy plan calling for a significant increase in the rate of construction of power plants over the next 20 years.

On May 18, 2001, President Bush issued two new Executive Orders that specifically implemented certain environmental permitting recommendations set forth in the National Energy Policy Final Report. In one Executive Order, titled "Actions to Expedite Energy-Related Projects," the President officially directed all federal agencies to take actions consistent with their statutory obligations to expedite approvals of permits for projects that would increase "the production, transmission, or conservation of energy." The President also formally established a federal interagency task force to assist federal, state, tribal and local agencies in expediting environmental permit processes for energy-related projects such as new electric generating facilities, particularly in areas of the country that are experiencing shortages.

In his other recent Executive Order, President Bush directed that federal agencies must complete a new regulatory impact review for any proposed or final agency rule that would qualify as a "significant energy action." See Executive Order on "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (May 18, 2001). These reviews (set forth in a "Statement of Energy Effects") are to be submitted to the Office of Management and Budget ("OMB") as part of OMB's existing review procedures for administrative rules. This Executive Order defined a "significant energy action" as any final rule or rulemaking proposal that "is likely to have a significant adverse effect on the supply, distribution, or use of energy," and is deemed a significant regulatory action under existing OMB rules, or is designated by OMB's Office of Information and Regulatory Affairs as a "significant energy action." Depending upon the final regulatory option selected by EPA, the CWIS final rule could be a "significant 'energy action."

Calpine currently is building new plants at an ever-increasing rate and will .have new power plants' on line this summer to help ease the California energy crisis. Throughout this process, Calpine is ensuring that its plants meet stringent environmental standards both for air and water. This includes implementing site-specific cooling water intake controls as established by state and local regulators. Calpine's cooling water intake structures have never been subject to substantiated allegations of adverse environmental impacts.

EPA Response

The commenter cites two new Executive Orders related to energy projects: (1) Actions to Expedite Energy-Related Projects and (2) Actions Concerning Regulations That Significantly Affect Energy

Supply, Distribution, or Use. This final rule and its supporting analyses comply with both Executive Orders, as explained below.

(1) In response to concerns about delays associated with pre-operational study requirements, EPA has designed the final section 316(b) New Facility Rule to minimize such delays. The two track approach allows facilities to avoid the three-year baseline study by complying with the requirements of Track I. EPA's analysis shows that 93 percent of in-scope combined-cycle facilities and 71 percent of in-scope coal facilities already comply with the dynamic flow requirements of Track I in the baseline and therefore would not experience any operational delays. In addition, lead times for the construction of new combined-cycle and coal facilities range from three to four years (Table 43 of the Assumptions to the Annual Energy Outlook 2001). Therefore, the facilities that choose to comply with Track II and have to conduct a demonstration study that may require up to three-years will have sufficient time to incorporate the study into their construction plans. For facilities that plan to begin operation in the next three or four years, EPA has revised the demonstration study provisions so they are highly flexible to help reduce or eliminate operational delays.

(2) EPA determined that the final section 316(b) New Facility Rule is not a "significant energy action" as defined in Executive Order 13211 ("Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use") because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. EPA analyzed the potential energy effects of the rule and determined that the maximum reduction in available energy supply will be 100 MW over 20 years (see Chapter 9: Other Economic Analyses). EPA believes that the estimated reduction in available energy supply as a result of the final section 316(b) rule does not constitute a significant energy effect.

Comment ID 316bNFR.512.004

Subject Matter Code MISC

Miscellaneous Comment

Author Name Donald Neal

Organization Calpine Eastern Corporation

Further, as recognition regarding Calpine's expertise and unique perspective on cooling water intake controls, I was invited by EPA to participate in a "panel of experts" regarding cooling water intake issues that met on May 23, 2001. Calpine appreciates very much EPA's recognition of the hard work, high level of expertise, and competency necessary to serve on this panel.

EPA Response

No response necessary.

Comment ID 316bNFR.512.005

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Donald Neal

Organization Calpine Eastern Corporation

Calpine's November 9, 2000 comments supported a minimum regulatory threshold for CWISs that withdraw up to 20 million gallons per day ("MGD"). Calpine continues to support 20 MGD as a viable threshold but in response to EPA's NODA and other commenters' (including numerous industry commenters, the U.S. Department of Energy ("DOE"), and the U.S. Small Business Administration ("SBA")) support for a 25 MGD cutoff, Calpine believes that for consistency and simplicity purposes, a 25 MGD threshold is both appropriate and supportable. The 25 MGD cutoff will encourage water efficiency and the implementation of efficient cooling technologies, consistent with the 20 MGD threshold Calpine previously supported. Even with the 25 MGD threshold, EPA still would regulate greater than 99 percent of the total flow from utilities. EPA's authority to regulate CWISs provides the Agency with the discretion not to regulate structures with no (or de minimis) potential for harm. Intake structures that do not withdraw more than 25 MGD should not be included in the definition of CWIS for regulatory purposes.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. While at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.512.006

Subject Matter Code 10.16

Two Track Process

Author Name Donald Neal

Organization Calpine Eastern Corporation

For CWISs that withdraw greater than 25 MOD, the two-track alternative identified in the NODA appears to be a feasible regulatory alternative. However, the NODA seems to confuse the relatively straightforward two-track alternative presented to EPA by the utility industry ‘by further providing a variety’of alternatives that appear at first glance to make the alternative less attractive. Based upon the very limited comment period, Calpine still is analyzing this alternative and may offer EPA more input in the near future (that the Agency can accept or reject at its discretion after the close of the comment period).

EPA Response

The objective of EPA's two-track approach is not its "attractiveness", rather, to provide two options where the permittee would, depending on its situation, make use of one over the other and accomplish, at the same time, certainty, compliance and a reasonable, affordable and realistic permit. If the facility's goal is to be expeditions and come on line quickly, Track I would provide such certainty and speed. If, however, the facility can compile data and make a demonstration, within a reasonable time, that would allow it to be able to fulfill the requirements of Track II and its site-specific approach, the permittee may want to avail itself of more flexible technologies and/or activities to accomplish comparable reductions as in Track I. See section V for further discussions on the details of Track I and II requirements and section VII for implementation issues.

Comment ID 316bNFR.512.007

Subject Matter Code CP

Comment Period

Author Name Donald Neal

Organization Calpine Eastern Corporation

Once EPA has more narrowly tailored this alternative prior to its internal option selection process, Calpine would encourage EPA to hold an open meeting for stakeholders to receive additional information. Such a meeting is appropriate, considering EPA's tight rulemaking deadline and the vagueness with which the Agency has presented in the NODA the various versions of this two-track process.

EPA Response

EPA is completing the new facility rule under court order with limited resources. It is imperative that the rulemaking proceedings be completed by the court-ordered deadline. A public meeting for stakeholders to receive additional information on the final rule is too resource intensive given EPA's schedule for completing the rule. However, EPA's practice is to meet with any individual or group of stakeholders who request a meeting to discuss the rulemaking effort.

Comment ID 316bNFR.512.008

Subject Matter Code 10.16

Two Track Process

Author Name Donald Neal

Organization Calpine Eastern Corporation

The overall conceptual framework of the 25 MGD exemption and the two-track process for larger intake needs seems to be a logical approach. This framework provides incentives to develop and implement cooling systems that require relatively small intake needs (less than 25 MGD), while focusing more on larger intakes. However, the approach for larger intakes (greater than 25 MGD) would provide state flexibility, a concept inherent in the Clean Water Act and in EPA Administrator Whitman's overall approach to limit federal mandates.

EPA Response

See 40 CFR 125.81 for the regulatory language of who is subject to today's rule. In addition, see preamble section I and elsewhere in this comment response document for further discussion on who is subject to today's rule.

Comment ID 316bNFR.512.009

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Author Name Donald Neal

Organization Calpine Eastern Corporation

EPA is faced with a very difficult task of defining "adverse environmental impact" ("AEI") so as to provide needed regulatory flexibility, but at the same time make the definition both concise and "implementable." Calpine certainly rejects the "one-fish" approach discussed in the NODA and supports DOE's and other commenters' opinions that AEI be assessed in terms of impacts to "fish populations." Calpine agrees that different levels of protection may be appropriate for different aquatic populations; for instance, not protecting non-native nuisance species.

Calpine understands that DOE has contracted with Argonne National Laboratories to examine AEI issues and alternatives. The Company will monitor this process and any possible recommendations regarding technologies that might be applied to minimize various potential impacts.

EPA Response

Please see responses to comments 316bNFR.507.004 (AEI interpretation/population-level assessments) and 316bNFR.516.020 (nuisance species). EPA disagrees that cooling water intake structures impinge and entrain one fish.

Comment ID 316bNFR.512.010

Subject Matter Code 2.1

Clean Water Act Requirements

Author Name Donald Neal

Organization Calpine Eastern Corporation

While Calpine does not support a national mandate based solely on dictating actual cooling technologies, 316(b)'s analogous relationship to the effluent limitations guidelines, stormwater, and other Clean Water Act programs supports a focus on intake structure technologies apart from focusing on water quality standards or specific impacts. In certain site-specific instances where a state or local regulator has a unique water quality issue, the regulator should retain flexibility to address that issue during actual permitting. Nevertheless, certain national guidelines would help to streamline any site-specific determinations by clearly delineating the local regulators' responsibilities, much as the NPDES Permit Writers' Manual does for wastewater permitting. This approach is consistent with the 25 MGD exemption and the two-track process for larger intake structures.

EPA Response

EPA describes the rationale for selecting the approach of the final rule in the preamble to the final rule. EPA believes the final rule strikes the right balance between the need for certainty for the regulated community and the states, especially for new facilities, with some flexibility where performance in terms of reduction in impingement mortality and entrainment is comparable to that achieved by meeting track 1 requirements. As always, section 510 of the CWA affords the state the right to be more stringent than federal requirements.

Comment ID 316bNFR.512.011

Author Name Donald Neal

Organization Calpine Eastern Corporation

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

In the NODA, EPA identified a number of other environmental impacts associated with various regulatory alternatives; for example, the increased air pollutant emissions associated with certain technologies. The Agency must ensure that any possible action that may be mandated as a result of the CWIS rulemaking takes into account other mandates on affected industries. Currently, EPA also is in the process of developing MACT standards for the gas combustion turbine NESHAP. Therefore, EPA's Offices of Air and Water potentially will affect the various performance standards with regard to one environmental medium that also will directly affect the ability of facilities to comply with standards for the other environmental medium. These regulatory program offices must work in conjunction to provide industry with cost-effective compliance alternatives that meet both offices' and relevant statute's objectives.

EPA Response

The Agency has worked in a concerted manner on the issue of air emissions increases from the installation of technologies to meet the requirements of this rule. It is the Agency's position that potential air emissions increases from gas combustion turbines as a result of this rule will not conflict with future MACT standards. Due to the limited number (four) of projected gas turbine utilizing facilities (i.e. combined-cycle) projected to upgrade their cooling systems from once-through to closed-cycle as a result of this rule, the overlap of effected regulated entities is extremely small. In addition, the energy penalties due to utilizing closed-cycle versus once-through cooling for combined-cycle plants is extremely small at the facility and national level (i.e., 0.5 percent mean annual energy penalty).

Comment ID 316bNFR.512.012

Author Name Donald Neal

Organization Calpine Eastern Corporation

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

In Calpine's November 9, 2000 comments, the Company identified a number of areas where EPA has grossly underestimated costs. At the May 23, 2001 Experts Meeting, Calpine identified more areas where EPA appears to have grossly underestimated costs associated with various technology options, both for new and existing facilities. EPA must conduct a more thorough investigation and analysis regarding possible costs associated with the rulemaking prior to conducting its internal regulatory options evaluations. EPA should share these cost analyses with participating stakeholders.

EPA Response

EPA has addressed the commenters November 2000 comments on the cost estimates of the proposed rule. See responses to comments #316bNFR.202.008 and #316bNFR.202.032.

EPA notes that the transcript of the May 2001 Experts Meeting is included in the record of this final rule. EPA has considered all the relevant technical comments received during this meeting as they apply to this new facilities rule.

Finally, EPA views the analysis of possible costs associated with the rulemaking to be as thorough as possible for the national rule. The Agency has shared the cost analyses with all participating stakeholders as often as the rulemaking process affords. In fact, the 2001 Experts Meeting referenced by the commenter is just such an example.

Comment ID 316bNFR.512.013

Subject Matter Code 11.0

Best Technology Available-Location

Author Name Donald Neal

Organization Calpine Eastern Corporation

The NODA requests comments on the application of the Endangered Species Act and Essential Fish Habitat laws to the proposed regulation, but Calpine believes that no appropriate documents exist in the docket that explain the possible impacts of these laws. Therefore, until such documents exist, if ever, Calpine reserves its right to comment at an appropriate later date.

EPA Response

No response necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William E. Driscoll

On Behalf Of:

TXU Business Services

Author ID Number:

316bNFR.513

Note

Fully supports the comments made by UWAG (316bNFR.524) and EEI (316bNFR.525)

Comment ID 316bNFR.513.001

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name William E. Driscoll

Organization TXU Business Services

Due to the comprehensive comments submitted by EEl and UWAG, TXU will only address the issue of dry cooling technology. TXU is opposed to any requirement to install dry cooling towers as a means of complying with the requirements of 316(b) of the Clean Water Act.

The effectiveness of dry cooling systems is heavily dependent on ambient temperatures and humidity. While these systems may be effective in some parts of Europe, the climate of the United States, particularly the southern region, is simply not conducive to this technology. This is especially true in Texas where the ambient temperature routinely exceeds over 100 degrees during the May-September time period. Dry cooling would not only dramatically increase costs and decrease efficiency but could also possibly affect the availability of electricity during the summer months.

EPA Response

EPA rejects dry cooling as best technology available for the reasons discussed in Section V.C of the preamble to the final rule. However, EPA promotes dry cooling and recirculating wet cooling as means by which the electricity generation industry can substantially reduce its impacts on the environment. Although EPA has rejected dry cooling technology as a national requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas).

EPA agrees the effectiveness of dry cooling systems is dependent on ambient temperature and humidity. See Section V.C of the preamble to the final rule and responses to comments #316bNFR.056.044.

Also see comments #316bNFR.206.012, #316bNFR.206.013, and #316bNFR.206.014.

Comment ID 316bNFR.513.002

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Author Name William E. Driscoll

Organization TXU Business Services

TXU believes any requirements for cooling water intake structures should be site-specific and take into consideration regional differences. The ecosystem and characteristics of each reservoir is unique and should be viewed independently.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

On Behalf Of:

Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Author ID Number:

316bNFR.514

Comment ID 316bNFR.514.001

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

We are particularly concerned about older power plants grandfathered under the Clean Air Act, and view the current efforts to regulate cooling water intake structures ("CWIS") as an important step towards the modernization of the electric power generating industry.

Electric power generating stations are among the most polluting industrial sources of air and water contaminants. Trace elements released during the combustion of coal and other fossil fuels contribute to an assortment of hazards to human health and the environment. Fine particle pollution, or soot, emitted from power plants is responsible for increased incidence of respiratory disease, increased risk of death, and decreased life spans. <fn2> Mercury and other hazardous air pollutants poison the environment, accumulate in food chains, and pose a serious risk to human neurological development. <fn3> Combustion waste, a highly toxic by-product of fossil fuel combustion, contaminates groundwater and can drastically elevate the risk of cancer in exposed communities. <fn4>

In the course of our efforts to improve the regulation of air emissions and other pollution from electric power generating stations, we became aware of the Environmental Protection Agency's proposed regulations implementing Section 316(b) of the Clean Water Act, 33 U S C S §1326(b) (2001). Section 316(b) requires EPA to ensure power plants and other facilities employ the best technology available for minimizing the significant adverse environmental impact that cooling water intake structures have on waterways. The regulation of intake structures complements the substantial efforts made by the organizations listed above to limit the damage done to the environment by the electric power industry.

Footnotes

2 CLEAN AIR TASK FORCE, CRADLE TO GRAVE: THE ENVIRONMENTAL IMPACTS FROM COAL, at 5 (June 2001), see also CLEAN AIR TASK FORCE, DEATH, DISEASE & DIRTY POWER, at 3 (October 2000) (discussing various threats to health and environment posed by power plants).
3 CLEAN AIR TASK FORCE CASTING DOUBT at 7-8 (revised August 2000).
4 CITIZENS COAL COUNCIL, ET AL , LAID TO WASTE THE DIRTY SECRET OF COMBUSTION WASTE FROM AMERICA'S POWER PLANTS, at.7 (February 2000).

EPA Response

This comment addresses existing power plants, and, as such, is not addressed by this rule.

Comment ID 316bNFR.514.002

Subject Matter Code	1.2
	Consent Decree

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Pursuant to an agreement reached by the parties in the ongoing case of Riverkeeper, Inc v Whitman, <fn5> the rulemaking process under Section 316(b) was divided into three phases. <fn6> Last summer, the Environmental Protection Agency (EPA) proposed Phase I regulations to govern the intake of cooling water at new power plants and industrial facilities. <fn7> On May 25, 2001, EPA made available for review the data and information that the agency obtained since it proposed the rule. <fn8>

Footnotes

5 No. 93-Civ.0314 (AGS) (S.D.N.Y.)
6 Under Phase I, EPA is required to issue a final rule governing new facilities that employ a cooling water intake structure by November 9, 2001. Under Phase II, EPA must propose regulations for existing utilities and non-utility power producers whose intake capacity levels exceed a given minimum threshold by February 28, 2002; final regulations are due August 28, 2003. Finally, under Phase III, a proposed rule governing any remaining unregulated facilities that employ a cooling water intake structure is due June 15, 2003, and a final rule is due December 15, 2004.
7 65 Fed. Reg. 49060 (August 10, 2000).
8 66 Fed. Reg. 28853 (May 25, 2001).

EPA Response

This excerpt from the comments submitted by the commenter does not contain a particular suggestion regarding how the final rule should be framed, but is merely the commenter's view of the history of section 316(b) of the Clean Water Act. The regulatory history of section 316(b) and legal basis for the final rule are presented in the preambles to the proposed and final rules.

Comment ID 316bNFR.514.003

Subject Matter Code	10.01
Regulatory Framework Options	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

In its proposed rule, EPA has determined that different types of source waterbodies require separate levels of protection. In the most ecologically sensitive waterbodies, the Agency designated a performance standard equivalent to closed-cycle cooling as BTA.<fn11> In bodies of water deemed less vulnerable, the proposed rule would allow new plants to install once-through cooling systems.<fn12> This formulation is severely flawed -- the Agency's proposal to provide varying levels of protection to different bodies of water based on their perceived vulnerability is devoid of any statutory justification or other legal authority.<fn13>

Footnotes

11 In a closed-cycle cooling system, cooling water is piped through the condensers where it absorbs heat from the steam. The heated cooling water is then sent to a cooling pond or cooling tower and recirculated. Closed-cycle cooling systems typically consume tens of millions of gallons of cooling water per day. Tellus Institute, Comments on the EPA 's Proposed Regulations on Cooling Water Intake Structures for New Facilities, at 6 (November 8, 2000).

12 In a facility with a once-through cooling, water is taken from the source waterbody, routed through the condenser, heated, and discharged. Once-through cooling systems can consume hundreds of millions ofgallons of cooling water per day. Id.

13 Weyerhaeuser v. Costle, 590 F.2d 1011, 1042 (D.C. Cir. 1978) (finding that the EPA is required under the Clean Water Act to promulgate nationally uniform technology based standards without reference to the relative quality of specific waterbodies.)

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns.

Under the final rule EPA will allow once through cooling if the facility can meet the requirements commensurate with closed-cycle recirculating system. Some facilities may be located on huge waterbodies that are of low water quality and based on site-specific issues once through system could be supported if the requirements of Section 125.84 are met.

Comment ID 316bNFR.514.004

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

EPA's proposal also is flawed with respect to electric power generating stations. The proposed regulation plainly fails to comport with the Clean Water Act's requirement that cooling water intake structures employ the best cooling technology available. Even the most stringent BTA proposed by EPA — closed-cycle cooling — does not reflect the best technology currently available at electric generating stations for minimizing adverse environmental impact. The proposed rule endorses cooling technologies that are already outdated, and therefore fails to meet the stated goals of the Clean Water Act.<fn14>

The BTA standard is closely analogous to the strict, technology-forcing performance standard required of new sources under the Clean Water Act. Section 316(b) compels EPA to set BTA to ensure a level of protection commensurate with that which would be provided by the best cooling technology currently available. Furthermore, BTA must be the best technology available with respect to all of the criteria listed in Section 316(b), i.e., location, design, construction, and capacity. Cost is not among the factors enumerated in Section 316(b), and may not be considered when setting BTA.

Footnotes

14 See supra note 10.

EPA Response

While EPA agrees that it may reasonably interpret the statute to take a primarily technology-based approach to this rule for new facilities, EPA disagrees that it may not consider costs in establishing requirements under section 316(b). See response to comment 316bNFR206.014. In addition to that comment response, EPA notes that it is well established that EPA may consider costs in establishing effluent limitations guidelines (different tests apply to BPT, BCT and BAT) and new source performance standards. EPA has taken an analogous approach in its consideration of costs in this rule. While there are many cases discussing costs over the history of the effluent guidelines program, EPA provides a few here to explain the type of costs test that courts have applied in the technology-based CWA program: Amer. Meat Institute v. EPA, 526 F.2d 442, 462-463 (7th Cir. 1975)("No formal cost-benefit analysis is required in determining the 'best available' technology, though the Administrator is to take costs into consideration."); CPC Intern., Inc. v. Train, 540 F.2d 1329, 1341-42 (8th Cir. 1976)(There is no language in § 306 requiring a cost-benefit analysis. Rather, EPA is required only to take costs under 'consideration.' We conclude, therefore, that a cost benefit analysis

is not required in determining the reasonableness of the costs in achieving the new source standards. Accord American Iron and Steel Institute v. EPA, 526 F.2d 1027, 1059 (3rd Cir. 1975). What is required for new source standards is a thorough study of initial and annual costs and an affirmative conclusion that these costs can be reasonably borne by the industry.") It is inconsistent for the commenter to advocate EPA to interpret the references to 301 and 306 to support a technology-based approach to the rule but then to advocate that EPA may not consider the factors listed in sections 304(BAT) or 306 (NSPS) as part of the considerations of BAT or BADCT in determining "best technology available for minimizing adverse environmental impact" under CWA section 316(b).

Comment ID 316bNFR.514.005

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

For the electric generating sector, BTA must reflect dry cooling. If EPA adopts a technology-based BTA standard, it must designate dry cooling as that standard. Likewise, if the agency defines BTA according to a performance standard, the resulting standard must be the equivalent of dry cooling, especially with respect to intake capacity. Dry cooling is commercially available and widely used by the power industry -- indeed it is increasingly common in new power plants. The failure of the proposed rule to reflect this reality contradicts the language and the spirit of Section 316(b). Furthermore, we believe that BTA must be set as a uniform presumptive standard for the industry as a whole, not as a varying standard based on relative vulnerability of the host waterbody.

EPA Response

While EPA acknowledges dry cooling is commercially available and is currently in use at some places, EPA rejects dry cooling as BTA for the reasons discussed in Section V.C of the preamble to the final rule. In particular, EPA's record does not support a determination that dry cooling has been demonstrated at larger facilities. See responses to comments #316bNFR.206.012, #316bNFR.206.013, and #316bNFR.206.014.

EPA does not distinguish between waterbodies in terms of the requirements of this rule. See response to comment #316bNFR.047.001.

Comment ID 316bNFR.514.006

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

We are aware that some have argued that dry cooling has associated efficiency losses that can mean additional air emissions or solid waste emissions, all else being equal. But all else is not equal -- the use of dry cooling systems affords significant opportunities for improving transmission efficiency, and these gains can offset any loss in efficiency and associated air and solid waste emissions increases. By allowing utilities to site electric generating stations closer to consumers, dry cooling offers an important opportunity to reduce transmission distances and limit energy losses attributable to transmission line loss.

EPA Response

See response to comment 316bNFR.206.014.

Comment ID 316bNFR.514.007

Subject Matter Code	10.16
	Two Track Process

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

We support a framework that establishes dry cooling as the presumptive BTA or BTA performance standard. Under this approach, if EPA were to adopt some variant of a fast track option, an alternative technology could be installed at new facilities only if the applicant can demonstrate that its preferred technology will afford equivalent environmental protections in that specific case as would be achieved by the dry-cooling BTA.

EPA Response

See response to comment 316bNFR.529.029 and the preamble to the final rule.

Comment ID 316bNFR.514.008

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Each year billions of fish and other aquatic organisms are killed or injured by cooling water intake structures. Larger organisms can be impinged against intake screens, causing them to suffer from exhaustion or asphyxiation. Smaller organisms are often entrained, or drawn into the cooling system, where they become subject to an array of mechanical, thermal, and toxic shocks. In an effort to redress the problems of impingement and entrainment, Congress enacted Section 316(b) of the Clean Water Act. The statute reads:

(b) Cooling water intake structures. Any standard established pursuant to section 301 or section 306 of this Act [33 USCS § 1311 or 1316] and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. <fn15>

The “best technology available” standard is unique to Section 316(b). It is analogous, however, to the new source performance standard articulated in Section 306(a) (1) of the Clean Water Act, 33 US C S §1316(a)(1) (2001). Section 306 requires that performance standards mandate effluent reductions achievable by the “best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.” Like BTA, the best available demonstrated control technology standard (BADCT) is stringent, ambitious, and broad in scope. As technology-forcing standards, BTA and BADCT were each intended to spur the development of increasingly effective technological controls. Both standards allow wide-ranging approaches to the problem they were designed to tackle.

Like Section 306, Phase I of the cooling water intake structure rule applies only to new facilities. The notion that new facilities can more easily incorporate new technologies and comply with more stringent standards is endorsed by the Clean Water Act and other environmental statutes. <fn16> By establishing rigorous performance and technology standards for new facilities, Congress has forced the development of processes that are more protective of the environment. As older facilities are retired and their replacements are built in accordance with strict technology-forcing rules such as BTA and BADCT, the goal of the Clean Water Act to “restore and maintain the chemical, physical, and biological integrity of the Nation‘s waters” is advanced.<fn17>

Footnotes

15 Section 316(b) of the Clean WaterAct, 33 U.S. C.S. § 1326(1) (2001).

16 See, e.g., Section 111 of the Clean Air Act, 42 U.S.C.S. § 7411(2001) (establishing standards of performance for new stationary sources).
17 See supra note 10.

EPA Response

EPA agrees that it is reasonable to interpret section 316(b) to authorize a primarily technology-based approach to the final rule for new facilities. The commenter's comments speak exclusively to one part of a technology-based rule. EPA notes that other considerations, such as economic practicality and non water quality environmental impacts (including energy impacts) are also relevant to technology-based determinations under the CWA. These other factors are relevant to the option EPA selected and other options that EPA rejected in this rule.

Comment ID 316bNFR.514.009

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Section 316(b) requires that EPA identify the best technology available without reference to economic considerations. In the statute, Congress listed location, design, construction, and capacity as the factors for which EPA must determine BTA. Conspicuously, the statute makes no mention of cost.<fn18> In Whitman v. American Trucking Associations, the Supreme Court ruled that the projected cost of compliance is not a relevant factor in environmental rulemaking unless the underlying statute explicitly enumerates cost as a valid consideration.<fn19> The Court's ruling confirmed the position taken years earlier by the D.C. Circuit Court of Appeals in Lead Industries Association v. EPA.<fn20>

Footnotes

18 Compare 33 U.S.C.S. § 1326(b) (statutory language governing cooling water intake structures makes no reference to cost) with 42 U.S.C.S. § 7411(a)(1) (2001) (statutory language in the Clean Air Act governing new source performance standards specifically lists cost as a factor for consideration).
19 531 U.S. 457, 121 S. Ct. 903, 909-910 (2001). The Clean Air Task Force represented 16 environmental organizations as amici curiae before the Supreme Court in that matter.
20 647 F.2d 1130 (D.C. Cir. 1980).

EPA Response

While EPA agrees that it may reasonably interpret the statute to take a primarily technology-based approach to this rule for new facilities, EPA disagrees that it may not consider costs in establishing requirements under section 316(b). See response to comments 316bNFR206.014 and 316bNFR.514.004 for some examples of cases discussing the role of costs in technology-based effluent limitations guidelines and standards. There are many other cases on this topic. It is inconsistent for the commenter to cite the reference to section 310 and 306 as indicative of the type of approach EPA must take in that rule, but then to state that EPA cannot consider the factors enumerated in those sections in determining section 316(b) technology requirements.

The case comment cites, Whitman v. American Trucking Association, 531 U.S.457 (2001) dealt with health-based, national ambient air quality standards (NAAQS) issued under the CAA, not technology-based standards under the CAA (such as section 112 maximum achievable control technology (MACT) standards). In the CWA context, the analogy to NAAQS would be water quality standards issued under CWA section 303 (which are health based or designed to protect aquatic life or wildlife), not the technology-based standards issued under sections 301, 304, and 306 of the CWA. From the outset of the water quality standards program, EPA has explained that while economic factors may be

considered in designating uses, scientific and technical factors must justify criteria to meet those uses. 44 Fed. Reg. 25,223, -24, 25 (April 30, 1979). When criteria cannot be attained due to economic factors, the state may consider whether a change or "downgrade" the use designation for the waterbody would be appropriate. Id. at 25,224. See. e.g., Mississippi Comm. on Natural Resources v. Costle, 625 F.2d 1269, 1277 (5th Cir. 1980), where the Court addressed whether EPA's action disapproving the state's water quality criterion for dissolved oxygen was arbitrary and capricious because EPA failed to consider economic factors. In affirming EPA's disapproval, the Court stated that: "Nevertheless, we are convinced that EPA's construction is correct. See E.I. du Pont de Nemours & Co. v. Train, 430 U.S. 112, at 134-35. Congress itself separated use and criteria and stated that 'the water quality criteria for such waters [shall be] based on such uses. 33 U.S.C. § 1313(c)(2)(1976). The statute requires EPA to develop criteria 'reflecting the latest scientific knowledge." Id. § 1314(a)(1)(emphasis added). "The interpretation that criteria were based exclusively on scientific data predates the 1972 amendments. Water Quality Criteria vii (1968). Furthermore, when Congress wanted economics to be considered, it explicitly required it. See §§ 1311(b)(2)(A), 1312(b), 1314(b)(1976)." EPA reiterated this interpretation of the CWA and its implementing regulations in discussing section 304(a) recommended criteria guidance stating that they "are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects" and "do not reflect consideration of economic impacts or the technological feasibility of meeting the chemical concentrations in ambient water." 63 FR 36,742, 36,762 col. 3 (July 7, 1998).

These ambient water quality standards or ambient air quality standards are qualitatively different from technology based standards, which permit a consideration of costs. Case law related to CWA technology-based standards are cited above.

Comment ID 316bNFR.514.010

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

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The plain language of the statute directs EPA to set BTA so that the location, design, construction, and capacity of the cooling water intake structures reflects the best technology available for minimizing adverse environmental impact. Capacity, or the volume of cooling water pumped by a facility, varies significantly depending on the type of cooling technology utilized. Once-through cooling systems require hundreds of millions of gallons of cooling water per day; close-cycle systems consume tens of millions of gallons per day. <fn21> In companson, dry-cooling systems use only a few hundred thousand gallons of water per day.<fn22>

As others have pointed out in previous comments to the proposed rule, reducing the capacity of a facility is typically the most important factor in minimizing adverse environmental impact. <fn23> "When water is extracted from healthy natural waters, to an overriding degree the numbers of organisms killed be they fish, crustaceans, or members of the plankton increases with the volume of water pumped." <fn24> Because reduced capacity directly corresponds to reductions in impingement and entrainment and dry-cooling systems use negligible amounts of cooling water, dry cooling is significantly less harmful to fish and other aquatic organisms. Accordingly, dry cooling is the best technology available for minimizing adverse environmental impacts.

Footnotes

21 Tellus Institute, supra note 10, at 6.

22 Id.

23 See Riverkeeper, Inc., et al., Comments on EPA's Proposed Regulation for Cooling Water Intake Structuies at New Facilities Under Section 316(b) of the Clean Water Act, at 15 (November 9,2001). Given the importance of regulating capacity to the realization of Section 316(b)'s purpose, the failure by EPA thus far to identify BTA with respect to capacity is indefensible.

24 See Pisces International Ltd., Technical Evaluation of US Environmental Protection Agency Proposed Cooling Water Intake Regulations for New Facilities, at 27 (November 2000).

EPA Response

EPA agrees that it may regulate dynamic flow as a measure of capacity. See preamble to the final rule. EPA disagrees that dry cooling represents best technology available for minimizing adverse environmental impact" for the reasons set forth in the preamble to the final rule and elsewhere in the comment response document.

Comment ID 316bNFR.514.011

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Dry cooling must be designated as BTA for every type of source waterbody. In the proposed rule, EPA selected a closed-cycle cooling performance standard as the appropriate BTA for tidal rivers, estuaries, and the "littoral zones" of rivers, lakes, and reservoirs. <fn25> The Agency neglected to specify BTA for other sources deemed less vulnerable, thereby exposing most of the waters of the United States to once-through cooling. <fn26> Congress sought to avoid these types of water quality-based distinctions when it crafted the Clean Water Act. According to the DC Circuit Court of Appeals, the language of the Act, its legislative history, and the underlying policy considerations "make clear that based on long experience, and aware of the limits of technological knowledge and administrative flexibility, Congress made the deliberate decision to rule out arguments based on receiving water capacity." <fn27> Instead, a facility's performance is measured against strict, nationally uniform technology-based standards. <fn28>

In proposing a different BTA for different types of water, EPA relies on arbitrary distinctions <fn29> and fails to recognize that "all of the nation's waters have ecological value and support ecosystems that are vulnerable to damage." <fn30> Lacking a defensible rationale for its patchwork regulatory plan, and poised to do considerable harm even to those bodies of water it has deemed most vulnerable, EPA must reverse course and designate dry cooling or its functional equivalent as BTA for all bodies of water across the country. Unlike the Agency's proposed scheme, a nationally uniform BTA makes sense ecologically and administratively.

Dry cooling systems are neither experimental nor particularly rare. Rather, the technology is widely used throughout the world and is increasingly popular among the developers of new power plants. <fn31> The BTA standard created by Congress in Section 316(b) to govern intake structures is at least as stringent as the analogous "best available demonstrated control technology" new source performance standard. Consistent with the purpose behind of technology-forcing standards, Congress did not intend that BADCT candidate technologies be the industry standard. Instead, Congress indicated its intention that:

It will be sufficient, for the purpose of setting the level of control under available technology, that there be one operating facility which demonstrates that the level can be achieved or that there is sufficient information and data from a relevant pilot plant or semi-work plant to provide the needed economic and technical justification for such new source. <fn32>

There are more than 600 electric generating stations worldwide that employ dry cooling technology. <fn33> Any number of these facilities could be used to demonstrate the effectiveness of dry cooling and there is a wealth of field data and information "to provide the needed economic and technical justification for such new source." <fn34>

Footnotes

25 65 Fed. Reg. 49060, 49083.
26 See Id. at 49083-49085.
27 Weyerhaeuser, 590 F.2d at 1041.
28 Id ("Congress considered uniformity vital to free the states from the temptation of relaxing local limitations in order to woo or keep industrial facilities.")
29 See Pisces International, supra note 10, at 4.
30 Riverkeeper, supra note 10, at 29.
31 Tellus Institute, supra note 10, at 9.
32 American Iron & Steel Inst. v. EPA, 526 F.2d 1027, 1058 (3rd Cir. 1975) (quoting the House Report that accompanied the Clean Water Act).
33 Tellus Institute, supra note 10, at 9.
34 See, e.g., Id., supra note 10.

EPA Response

EPA does not distinguish between waterbodies in terms of the requirements of this rule. See response to comment #316bNFR.047.001.

EPA rejects dry cooling as best technology available for the reasons discussed in Section V.C of the preamble to the final rule. Also see responses to comments #316bNFR.206.012, #316bNFR.206.013, and #316bNFR.206.014. While EPA agrees with the court in Weyerhaeuser regarding the obligation to demonstrate receiving water benefits, EPA also believes at some point there are limits to this principal. See response to comment #316bNFR206.014.

Comment ID 316bNFR.514.012

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Dry Cooling Technology Can Be Beneficial to Air Quality

Dry cooling allows more efficient delivery of electricity from source to users. These potential gains can be more than sufficient to offset the slight efficiency losses that are associated with dry-cooling systems. <fn35> Because electric generating stations have traditionally used cold water to recondense steam, utilities have been forced to locate their power plants on the shores of lakes, rivers, oceans, and other waterbodies. The advent of dry cooling technology has broken power plants of their dependence on cooling water and released them from the need to locate adjacent to bodies of water. Not only has this development freed the owners of new generating facilities from limited siting options, it allows for the decentralization of electricity production, reductions in the size of individual plants, and more strategic plants sitings.

The amount of energy dissipated during the transmission of electricity is proportionate to the distance that the electricity must travel to reach a customer. Longer distances result in greater transmission inefficiency. On the average, 7.7% of the electricity generated at a power plant is wasted in the form of heat loss as the electricity travels from the plant to the user. <fn36> Much of that loss can be avoided by siting smaller plants closer to energy consumers. Smaller, more strategically located generating stations require shorter transmission lines, which in turn yield more efficient electricity distribution. By providing more flexibility as to siting, dry cooling allows for the realization of these potential gains in transmission efficiency.

For electric generating facilities, better transmission efficiency translates into reduced fuel consumption per kilowatt sold. The amount of fuel burned by a power plant corresponds directly to the amount of pollution emitted by the plant. Thus, assuming other factors remain static, improved transmission efficiency reduces pollution. We believe that energy savings attributable to better siting and shorter transmission lines are more than capable of offsetting the energy penalty associated with dry cooling. The net increase in system-wide efficiency can produce a decrease in air and solid waste emissions. By delinking large-scale power production from the availability of cooling water and allowing utilities to site smaller electric power generating stations closer to consumer demand, dry cooling technology can help reduce the levels of air pollution and other waste emissions.

Footnotes

35 The use of dry cooling systems can result in average efficiency loss between 1% and 2%." Tellus Institute, supra note 10,

at 7. “However, in cold climates, where ambient air temperatures are often significantly below 40 degrees F, dry cooling systems can actually be more efficient at removing heat than a comparable wet-cooling system.” Id. (emphasis in original.)
36 Tellus Institute, supra note 10, at 7.

EPA Response

See response to comment #316bNFR.206.014.

Comment ID 316bNFR.514.013

Subject Matter Code	10.16
	Two Track Process

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

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In the notice of availability, EPA considered a fast-track approach proposed by the Utility Water Act Group (UWAG) and solicited comment on its own variation on the UWAG plan. <fn37> The structure of the EPA proposal is identical to the UWAG proposal an applicant can agree to meet pre-approved, "highly protective" BTA standards in return for expedited permitting; otherwise, the facility's permit application will be analyzed on a case-by-case basis according to a set of site-specific criteria.

The UWAG Track 1 proposal suggests two performance-based standards that would qualify as BTA. The first optional standard would require the installation of any technology that limits the amount of water used to levels commensurate to the amount used in a closed-cycle cooling system and the average approach velocity of water drawn into the cooling water intake structure to no more than 0.5 feet per second. The second optional standard would allow a facility to install any technology that offers roughly the same level of protection against impingement and entrainment as would be provided by closed-cycle cooling. The maximum intake velocity would still be limited to 0.5 feet per second. <fn38>

Similarly, EPA's proposed Track 1 would require a facility to install any technology that restricts intake capacity to levels that would be used in a closed-cycle cooling system and linits the average approach velocity of water drawn into the cooling water intake structure to no more than 0.5 feet per second. EPA would also demand that a facility locate its intake structure so that capacity (i) does not exceed certain flow-based thresholds for freshwater streams or rivers, (ii) does not exceed 1% of the tidal excursion volume of a tidal river or estuary, or (iii) not disrupt the natural stratification and turnover patterns of a lake or reservoir. Additionally, EPA would require the installation of various devices designed to deter or exclude fish and other organisms from entering the intake structure. <fn39>

Track 2, as proposed by both industry and EPA would provide an applicant facility with an opportunity to demonstrate that technology options less protective than those listed above would sufficiently protect the source waterbody at the proposed site. Accordingly, this approach would require site-specific analysis of the source waterbody. The UWAG and EPA proposals differ with respect to the scope and the intensity of that analysis. <fn40>

The fast-track proposals offered by UWAG and EPA are needlessly complex. More importantly, they

contradict the clear mandate of Section 316(b), which require uniform national standards that reflect the best technology available. As discussed above, the best available technology for minimizing adverse environmental impact is dry cooling. By identifying closed-cycle cooling as the BTA, the proposals submitted by EPA and UWAG fall far short of the level of protection demanded by Congress.

Footnotes

37 66 Fed. Reg. 28853, 28868-871.
38 Id. at 28868-869.
39 Id. at 28870.
40 Id. at 28869-870 (describing UWAG's Track 2 proposal); see also id. at 28871 (describing EPA's Track 2 counterproposal).

EPA Response

EPA disagrees. Today's final rule reflects best technology available for minimizing adverse environmental impact on a national basis. Track II allows for a new facility to attain comparable levels of minimization by using, after site-specific studies and demonstrations, that different technologies (for example, innovative technologies) will accomplish comparable results. See response to comment 316bNFR.529.029 and the preamble to the final rule.

Comment ID 316bNFR.514.014

Subject Matter Code	10.16
	Two Track Process

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

There is a simpler approach, should EPA elect to adopt a fast-tract option: EPA either would designate dry cooling as BTA or define BTA as limiting intake capacity to levels commensurate to the volume of water used in a dry-cooling system, and then could expedite the issuance of NPDES permits to facilities that commit to installing a cooling process that meets or exceeds the BTA requirement. Unlike the complicated and inadequate Track 1 approaches suggested by EPA and UWAG thus far, such a fast-track Option is straight-forward and legally supportable.

Track 2 would still be available to the permit applicant who does not want to commit to dry cooling or its functional equivalent. Under this approach, EPA would consider alternative applications on a case-by-case basis if, and only if, the permit applicant can demonstrate that some other cooling technology is equivalent to the designated BTA in minimizing adverse environmental impact at the chosen site. The agency could issue the required NPDES permit to an applicant who successfully shoulders the burden of demonstrating that at the proposed source waterbody the intake technology he or she seeks to install will minimize adverse environmental impact as well as or better than the BTA.

EPA Response

EPA agrees that a nationally uniform performance standard would simplify the permitting process under Track II of the final rule. However, EPA chose wet cooling systems as the technological basis for Track I requirements for the reasons discussed in Section V.C of the preamble to the final rule (also see responses to comments #316bNFR.206.012, #316bNFR.206.013, and #316bNFR.206.014). Additionally, facilities that choose to comply under Track II would need to demonstrate a reduction of impingement and entrainment to a level comparable to the Track I requirements (see Section V.C of the preamble for the final rule).

EPA does not distinguish between waterbodies in terms of the requirements of this rule. See response to comment #316bNFR.047.001.

Comment ID 316bNFR.514.015

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

As discussed above, dry cooling or its functional equivalent must be designated BTA for every body of water. In addition to the fact that this is the only legally supportable course of action, a nationally uniform BTA would significantly simpler the case-by-case analysis required under Track 2. For example, both EPA and UWAG propose preliminary focusing tests to determine whether Track 2 analysis is necessary for a given body of water. One of the criteria requires an analysis of the ratio of the projected intake capacity to the flow of the source waterbody.<fn41> The need to consider specific flow-based thresholds would be obviated by a nationally uniform BTA. Consequently, the analysis would be reduced to a single consideration Is the proposed facility designed to ensure that levels of impingement and entrainment are comparable to the levels that would be attributable to a similarly situated facility equipped with a dry cooling system? In order to obtain a NPDES permit for a facility using technology less protective than dry cooling, an applicant would be required to demonstrate that the answer to this question is yes.

Footnotes

41 See id. at 28869 (UWAG suggested that a facility need not conduct an entrainment analysis if it withdraws 5% or less of a river's 90% exceedance flow or 5% or less of volume of the biological zone of influence in a lake or reservoir, measured when entrainable life stages of representative species are present).

EPA Response

While EPA acknowledges dry cooling is commercially available and is currently in use, EPA rejects dry cooling as BTA for the reasons discussed in Section V.C of the preamble to the final rule. See responses to comments #316bNFR.206.012, #316bNFR.206.013, and #316bNFR.206.014.

EPA does not distinguish between waterbodies in terms of the requirements of this rule. See response to comment #316bNFR.047.001.

Comment ID 316bNFR.514.016

Subject Matter Code	2.2
Obligation Under 316(b)	

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

The cooling water intake structure rule proposed by EPA would violate the spirit and the letter of Section 316(b) of the Clean Water Act. Section 316(b) requires that the Agency establish BTA for location, design, construction, and capacity. The selected technology or performance standard must reflect, without reference to cost, the best available means for minimizing adverse environmental impact. Dry cooling is commercially widely available and is used efficiently throughout the world. Because dry cooling uses negligible amounts of water, it is the most effective technology for avoiding the impingement or entrainment of fish and other aquatic organisms. Accordingly, our organizations strongly urge EPA to designate dry cooling or its functional equivalent as the best technology available under Section 316(b) of the Clean Water Act.

EPA Response

See responses to comments 316(b)NFR 206.014, 316bNFR206.014 and 316bNFR.514.004 . For a discussion of the role of costs under section 316(b) in this new facility rule. EPA disagrees that dry cooling represents best technology available for minimizing adverse environmental impact" for the reasons set forth in the preamble to the final rule and elsewhere in the comment response document.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Dennis R. Fewless

On Behalf Of:

North Dakota Dept. of Health

Author ID Number:

316bNFR.515

Comment ID 316bNFR.515.001

Subject Matter Code 10.16

Two Track Process

Author Name Dennis R. Fewless

Organization North Dakota Dept. of Health

The North Dakota Department of Health supports the two-track alternative as the model for the final rule for new facilities. The Two-Track alternative presented in the NODA provides some real advantages over the approach EPA proposed on August 10, 2001 (65 Fed. Reg. 49,060). Under the alternative as we understand it, an applicant could pursue one of two tracks. Under the "fast track," the applicant could commit to meeting highly protective flow and velocity standards, or use one or more technologies providing similar levels of aquatic resource protection. Meeting the "fast track" criteria would satisfy § 316(b) by avoiding adverse environmental impact. Alternatively, the applicant could choose to conduct a site-specific study to determine the best technology available (BTA) for minimizing adverse environmental impact for the site.

The "fast track" provides a streamline process option when the criteria would be feasible and appropriate for the water body while Track 2 provides the flexibility to evaluate site specific challenges and concerns. We are pleased to see that the site-specific Track 2 approach could provide a varying level of study for various sites and designs. We appreciate that Track 2 provides some objective criteria by which a permit writer can reasonably assess whether a site-specific study demonstrates the facility will minimize AEI. For example, the alternative outlines using biological, locational, design, and operational data from the site in a manner consistent with EPA's Risk Assessment Guidelines.

EPA Response

See response to comment 316bNFR.505.002 and the preamble to the final rule.

Comment ID 316bNFR.515.002

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Dennis R. Fewless

Organization North Dakota Dept. of Health

North Dakota Department of Health recommends that EPA adopt an approach under which intakes that withdraw small volumes or that use less than half of the intake water for cooling purposes be exempted from the rule or subjected to a much less stringent level of controls. The final regulations should be geared to those facilities that are most likely to cause an adverse environmental impact (AEI).

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold discussed below to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately 68 percent of manufacturing facilities that meet other thresholds for the rule and 93 percent of power-generating facilities that meet other thresholds for the rule use more than 25 percent of intake water for cooling. In contrast, approximately 49 percent of new manufacturing facilities use more than 50 percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms.

Finally, the Agency notes that Track I of the rule includes reduced requirements for new facilities that withdraw between 2 and 10 MGD.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.515.003

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name Dennis R. Fewless

Organization North Dakota Dept. of Health

We also encourage EPA to consider all types of adverse environmental impacts, including those involving other media (e.g., air emissions, noise, water usage) when defining AEI.

EPA Response

See responses to comments 316bNFR.014.019 and 316bNFR.068.100.

Comment ID 316bNFR.515.004

Subject Matter Code	9.45
Request for Comment: Adapt 316(a) Standard	

Author Name Dennis R. Fewless

Organization North Dakota Dept. of Health

We believe AEI should be defined as biologically meaningful population- and community-level impacts. We would prefer the option presented in the NODA of using the language found in § 316(a), which regulates thermal discharges, as guidance for determining AEI. That standard, "assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and: on that body of water," would be workable and consistent with state goals of ensuring adequate protection to aquatic resources. The other option, "recurring and non trivial" appears too broad and vague.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.511.005, 316bNFR.068.008, and the preamble to the final rule.

Comment ID 316bNFR.515.005

Subject Matter Code 2.1

Clean Water Act Requirements

Author Name Dennis R. Fewless

Organization North Dakota Dept. of Health

We appreciate the opportunity to comment on EPA's proposals for guiding the implementation of Section 316(b) of the Clean Water Act. It is certainly important to balance the need for federal authority with a tailored regulatory program that will fit the unique aspects of our state waters. We must take into account the numerous biological, hydrological, and ecological factors that affect our waters. The two-track process described in the NODA provides a balance of federal guidance and state decisionmaking authority and thus leads to efficient and environmental protective permitting decisions.

EPA Response

EPA agrees with the comment.

Comment ID 316bNFR.515.006

Subject Matter Code CP

Comment Period

Author Name Dennis R. Fewless

Organization North Dakota Dept. of Health

Considering the complexity of the rule and potential implications to our state, we respectfully request your consideration of any additional comments we may file after the June 25, 2001, comment deadline.

EPA Response

Please see response to 316bNFR.505.001.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jerry Schwartz

On Behalf Of:

American Forest & Paper Assn.

Author ID Number:

316bNFR.516

Comment ID 316bNFR.516.001

Subject Matter Code CP

Comment Period

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

AF&PA appreciates EPA staff responsiveness regarding questions and requests on the NODA, in light of the short comment period required to comply with the court-ordered rule promulgation schedule. The EPA staff made every effort to provide access to all commenters to the NODA documents in a timely fashion given the tight time constraints. In addition, EPA offered AF&PA the option of providing supplemental comments on the topics in the NODA throughout the summer since AF&PA's forest products companies will be in Phase III's rulemaking. Without this additional time, EPA would not receive thoughtful and useful comments.

EPA Response

No response necessary. EPA looks forward to working with the commenter as EPA continues to develop regulations under section 316(b).

Comment ID 316bNFR.516.002

Subject Matter Code	8.2
Identification of New Manufacturing Facilities	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

As stated in AF&PA's November 2000 comments (attached), the forest products industry does not anticipate construction of a significant number of new facilities over the next decade. The current economic climate makes this especially unlikely.

The U. S. paper industry produces paper and paperboard at 512 mills and manufactures pulp at 183 sites. The industry recorded aggregate sales of $185 billion in 2000 that accounted for approximately 4% of total U.S. manufacturing sales. The paper industry employs approximately 661,000 people—of which 206,000 work at pulp, paper and paperboard mills and the remainder work at converting plants. The industry produced 94 million tons of paper and paperboard in 2000 and 8.5 million tons of market pulp.

The CWA 316(b) program could impose very significant costs on the forest products industry, such as the cost of potential entrainment and impingement control devices, biological monitoring studies, and the significant costs in lost energy efficiencies. In some cases, (such as where cooling towers might be required), the cost in lost energy efficiencies exceeds the cost of impingement and entrainment controls, an important point that EPA needs to consider for Phase I and Phase III rulemaking. AF&PA made this assertion in our November 2000 comments.

The potential energy losses as well as mitigation control costs to reduce impingement and entrainment are even more important in our industry since AF&PA filed its comments. Since that time, AF&PA member companies have closed 16 mills, some citing higher energy costs, in part, as a basis for their decision. Between January and Summer 2001, at least 10 additional mills have indicated their plans to close. The cumulative mill closure number since 1998 is 49 mills, not including two mills that have announced they will close later in 2001. Mills also have had to curtail operations due to higher energy costs. AF&PA asks EPA to consider these comments and the November 9, 2000 comments against this economic background.

EPA Response

As confirmed by the commenter, EPA does not expect many new in-scope facilities to be built in the forest products industry in the near future. In addition, EPA's economic analysis showed that for the few projected new in-scope facilities, the cost burden of the final rule is very small compared to estimated facility revenues. EPA therefore believes that the potential for impact on this industry as a result of the final section 316(b) New Facility Rule is minimal and that the rule is economically practical.

EPA conducted an analysis of potential effects of the final rule on electricity prices. This analysis showed that the per KWh hour increase in electricity prices, if electric generators were able to pass on compliance costs to their customers, is very small (see Chapter 9: Other Economic Analyses). EPA has also provided information in Response to Comment 316bNFR.068.332 addressing energy

penalty issues. With respect to the commenters concern that in some cases where cooling towers might be required the cost in lost energy efficiencies exceeds the cost of impingement and entrainment controls, EPA believes that today's rule is economically practicable and achievable as demonstrated by the fact that cooling towers are widely used and that over 90 percent of the recently built or planned combined cycle facilities use closed cycle cooling systems. Also, estimates of energy penalties that the commenter provided presume that waste heat reuse (it is a common technique for the forest product industry to reuse cooling water or process water and vice versa) will be prevented by the flow reduction requirements of this rule. As discussed in the Response to Comment 316bNFR.062.018, waste heat reuse at manufacturing facilities is not impeded by this rule and to some extent may be encouraged by today's rule. Therefore, the energy impacts on the forest products facilities is not as severe as suggested by the commenter.

EPA therefore does not believe that this rule will lead to significantly higher energy costs for industries such as the forest products industry.

Comment ID 316bNFR.516.003

Subject Matter Code EXIST

Existing Facility Rule

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

The forest products industry is seriously concerned with the proposed rule for New Facilities and the possible relationship to Existing Facilities, for which a proposed rule is expected in the summer of 2003. AF&PA urges EPA to seriously consider the following points in response to the NODA, in addition to the comments submitted in November 2000. AF&PA intends to follow up with EPA on several issues—including cogeneration, energy generation and the potential negative impacts of Section 316(b)'s regulatory program on energy generation in the forest products industry. AF&PA intends to submit this in late July following a meeting with EPA, DOE and EPA contractors later this summer of 2001. <fn1>

Footnotes

1 Mr. Claudio Ternieden of EPA has stated he would accept this white paper after the deadline for the NODA comments since it involves energy and cogeneration data that was not available in time to respond to the NODA.

EPA Response

See response to comment 316bNFR.024.003. If the commenter submitted late comments, EPA responded to them to the extent possible given the schedule for the rule. EPA also consulted with Mr. Claudio Ternieden (of EPA, on detail from the State of Indiana Dpt. Of Environmental Management) who stated that the commenter was told by him that late comments could be submitted, that they would still be marked as late comments, but that they would be answered to the extent possible given the schedule of the rule.

Comment ID 316bNFR.516.004

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

AF&PA's recommendations:

The 25 MGD applicability should be the off-ramp from any further Section 316(b) studies, monitoring, CWIS permit reviews, control technologies, or other requirements. The 25 MGD threshold should make the facility excluded from the Section 316(b) program. Further, as explained in AF&PA's November 9, 2000 comments, the Clean Water Act does not provide authority for the imposition of case-by-case section 316(b) requirements for facilities not covered by the 316(b) nationwide standards. Moreover, if would eliminate the simplicity and predictability that applicability thresholds are designed to achieve, if every facility withdrawing cooling water, no matter how little, would potentially be subject to case-by-case section 316(b) determinations.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 15 MGD, 32 percent of the manufacturers, 29 percent of the nonutilities, and 50 percent of the utilities would be covered, as would 97.3 percent of the total flow. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. While at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces

the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

Comment ID 316bNFR.516.005

Subject Matter Code 7.4

Water Withdrawal threshold

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

EPA should set a practical and appropriate threshold for applicability of the rules covering both New and Existing Facilities. The threshold should ensure that the resources of the regulatory agencies and the regulated public are focused on situations that present significant potential for causing adverse environmental impacts (AEI), and therefore warrant further investigation. EPA has the authority to set such reasonable thresholds and is required to consider more reasonable regulatory approaches, such as applicability thresholds and credits for process water, water reuse, and water used for cogeneration.

EPA Response

No response needed.

Comment ID 316bNFR.516.006

Subject Matter Code 10.0

Best Technology Available

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

The EPA should consider alternatives in selecting technologies for controlling Entrainment and Impingement.

EPA Response

For this rulemaking EPA has considered alternatives for selecting technologies for entrainment and impingement. See Section VIII of the proposed rule, section V of the final rule, and the Technical Development Document supporting the final rule. Under the two-track technology-based approach published today facilities can assess alternative technologies for their site to determine whether they will meet the performance requirements set forth in Section 125.84. As the commenter is a manufacturer, EPA also notes that heated cooling water that is subsequently used in a manufacturing process is considered process water for the purpose of calculating the percentage of a new facility's intake flow that is used for cooling purposes in section 125.81(c).

Comment ID 316bNFR.516.007

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The EPA suggested threshold for applicability of 2 million gallons per day (MGD) is not defensible and is too restrictive. EPA should revise the threshold to better focus resources on cooling water intake structures warranting additional investigation, and to reduce the impact on those facilities covered by the rule, including smaller businesses. AF&PA is aware of scientific studies and analyses to demonstrate that the threshold could be substantially higher than 2 MGD.

EPA Response

See response to 316bNFR.051.007.

Comment ID 316bNFR.516.008

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 23.4

Other Requirements (UMRA, RFA, SBREFA)

EPA should consider small business implications and regulatory alternatives when selecting control technologies under the Small Business Regulatory Enforcement Fairness Act (SBREFA). These controls should be based upon population protections.

EPA Response

EPA has fully considered the small business implications and regulatory alternatives when selecting control technologies. For a detailed discussion of EPA's position on small entity impacts, please see the response to comment 316bFNR.012.005 above.

For a discussion of population modeling, see responses to comments 316bNFR.056.070 and 316bNFR.068.090.

Comment ID 316bNFR.516.009

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The applicability threshold should be raised to 25 MGD after the mill receives an appropriate credit for the amount of water used for cogeneration, water reuse, and process water. These thresholds still would result in the more than half of the forest products industry mills and flow being subject to the regulation. Moreover, industry studies of existing facilities with intake flows above the thresholds we are proposing have not demonstrated widespread impacts to fish populations. AF&PA intends to comment more fully on this point during the comment period for Phase III. This 25 MGD threshold was supported by the Department of Energy, the Small Business Administration and approximately 17 business associations and companies in the New Facility rulemaking comment period completed in November 2000. This threshold approach has been supported by DOE and SBA again during this NODA comment period and continues to be favored by business associations and companies. This 25 MGD threshold (after credits for process water, reused water and water for cogeneration) is environmentally protective.

EPA Response

See response to 316bNFR.518.007.

Comment ID 316bNFR.516.010

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

For existing pulp and paper mills, a 25 MGD cutoff still would result in approximately 85% of the mills and intake flow being subject to regulation. <fn2> This does not mean, though, that larger mill intake structures present a significant risk of AEI. We believe that the vast majority of those mills would be able to demonstrate no AEI on a fish population basis.

Footnotes

2 A 316(b) docket, DCN 1-1049-TC.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

A threshold of 25 MGD would cover 94.9 percent of the total flow, but many facilities who could technically achieve and economically afford the requirements of the rule would not be regulated. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, these facilities that are not regulated would need to be addressed on a case-by-case basis, using best professional judgment of the permit writer. As other parts of this record demonstrate, this is a lengthy process that is not preferable where there is a particular need to permit new facilities more quickly. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

Comment ID 316bNFR.516.011

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

After 25 years of research on the impacts of cooling water intake structures, EPRI <fn3> has failed to identify a single site where conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures. We do, however, recognize that at a few sites, potential impacts remain unresolved and require further investigation. We also recognize the potential for cumulative impacts from cooling water intake structure operation; however, there is no obvious evidence that cumulative impacts are of major concern and warrant overly conservative national performance standards to prevent them. AF&PA notes that the docket materials reflect the assertions made by EPRI that there are many utility operations where there are up to 500 MGD intake operations with no AEI. AF&PA is aware that EPRI and the Oak Ridge National Laboratory are conducting a study looking at intakes less than 500 MGD to demonstrate no AEI. AF&PA reserves the right to submit comments on this topic for Phase III rulemaking.

Footnotes

3 EPRI formerly was known as the Electric Power Research Institute.

EPA Response

EPA rejects the idea that population or community level impacts are the sole means of evaluating the effects of cooling water intake structures. As EPA has stated in the Preamble and elsewhere in the Response to Comments, adverse environmental impact includes: impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries, and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function.

EPA disagrees that today's rule is overly conservative and notes that the commenter does not explain what is meant by this phrase. Therefore, EPA cannot act further on this portion of the comment. Also, EPA disagrees that the docketed materials demonstrate that there is no adverse environmental impact for many utility operations with up to 500 MGD cooling water intake capacity given that the Agency believes that adverse environmental impact includes all the things identified above and the commenter's understanding of that concept is limited to population and community impacts.

EPA is also concerned about the scientific objectivity of a study which appears to have as its premise that intakes with an intake capacity of less than 500 MGD demonstrate no adverse environmental impact given the commenter's assertion of what that term includes. Please see Response to Comments 316bNFR.056.005, 316bNFR.068.050, and preamble sections III and VI.B for additional discussion of EPA's position on these issues.

Comment ID 316bNFR.516.012

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

EPA has missed the fundamental importance of the distinction between cooling water and process water in the forest products industry. EPA's definition of "cooling water" must be modified to reflect the forest products industry's reuse of the same water to perform both process and cooling functions. We included many case studies in our November 2000 comments to help EPA better understand this complex manufacturing process. The National Council for Air and Stream Improvement (NCASI) also submitted Confidential Business Information (CBI), including descriptions of water reuse in July 2000. The current definition of "cooling water" has the potential to cause industrial facilities to abandon current water reuse and energy conservation practices at a significant environmental and financial cost. Water reuse in the forest products industry is environmentally and economically beneficial and these benefits should be considered and encouraged when determining the final rule.

EPA Response

In the final rule EPA has defined cooling water such that heated cooling water that is subsequently used in a manufacturing process is considered process water for the purposes of calculating the percentage of a new facility's intake flow that is used for cooling purposes in § 125.81(c).

Comment ID 316bNFR.516.013

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

If the proposed rule as published in August 2000 were applied to Existing Facilities, pulp and paper industry emissions of CO2 could increase by over 1.5 million tons per year, with significant increases in SO2, PM and NOx emissions. EPA's concept of AEI should recognize that these negative environmental consequences are as significant as protecting fish populations through mitigation of entrainment and impingement. The air, climate and energy consequences should be considered when determining AEI.

EPA Response

See response to comment 316bNFR.062.016.

Comment ID 316bNFR.516.014

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

For facilities subject to the Section 316(b) program, EPA should use a tiered approach to examine site-specific conditions when determining AEI on aquatic systems. EPA has not sufficiently defined AEI, and this ambiguity will lead to delays in permitting that will frustrate both the regulated community as well as the public. EPA must provide for the use of many site-specific tools to address AEI on a population basis.

EPA Response

See response to comment 316bNFR.008.007.

See Section III of the preamble to today's rule for information as to why EPA is not defining AEI in this rule.

Comment ID 316bNFR.516.015

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 8.2

Identification of New Manufacturing Facilities

EPA should exclude the wood products segment of the industry from coverage of the Section 316(b) rules. As data in the docket demonstrate, those facilities use very little water and only a small fraction of their flows are comprised of cooling water. AF&PA has commented on this during the Detailed Questionnaire and during the proposed New Facility Rule Comment period.

EPA Response

See response to comment 316bNFR.062.032 in comment category 4.1 (Universe of Potentially Regulated Entities).

Comment ID 316bNFR.516.016

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

The forest products industry profile in the proposed rule for New Facilities does not properly determine the potential costs (both direct and indirect) in the Economic and Engineering Analysis (EAA). Moreover, EPA has not estimated the actual best technology available (BTA) costs for the forest products industry. EPA must include new information from the industry reflecting rising imports, reduced export sales, structural changes to the industry, mill closures, low operating rates, and increases in layoffs in any future economic analysis.

EPA Response

The commenter does not expand on the assertion that the proposed rule's EEA does not properly determine costs for the forest products industry. EPA has considered the commenter's suggestions for both the proposed rule and this notice of data availability regarding the potential costs to the forest products industry. In fact, the Agency has determined that changes to the rule were necessary based, in part, on some of the commenter's suggestions. Without further specificity, the Agency is unable to consider this comment further.

Regarding the assertion that EPA has not estimated the actual best technology available costs for the forest products industry, EPA notes, again, that the commenter does not expand on the meaning or context of the comment. Without such context the Agency is not able to further consider the general comment. However, EPA notes that significant changes to the rule have been made in response, in part, to some of the commenter's suggestions that address costs to the forest products industry from the technology based performance requirements of the final rule. For instance, see response to comment #316bNFR.062.018.

Regarding the commenter's suggestion that EPA include new information from the industry reflecting rising imports, reduced export sales, structural changes to the industry, mill closures, low operating rates, and increases in layoffs in any future economic analysis, the Agency notes that, again, no further detail is provided. In addition, no context for "future economic analysis" is provided. This is especially important for the new facility rule, as very few forest products industry facilities are projected within the scope of the new facility rule. Nevertheless, EPA has considered the commenter's suggestions in other submissions and comment areas that address the specific topics raised by this comment.

Comment ID 316bNFR.516.017

Subject Matter Code 19.2

Baseline Biological Characterization Study

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

AF&PA believes the SAIC study submitted to the Technical Consultants Meeting attendees should be re-worked with far clearer cost totals, explanation of cost ranges, and with more realistic biological monitoring and studies costs. Almost all participants at the May 23, 2001 technical consultants meeting said that the SAIC cost study was incomplete or wrong. AF&PA believes that the Phase III regulation should have clear and easily understandable cost estimates through the EPA or its contractors. The biological studies and permitting costs should reflect real world circumstances, not the optimal circumstances as offered in the SAIC study.

EPA Response

See Response to Comment 316bNFR.501.027.

Comment ID 316bNFR.516.018

Subject Matter Code 10.16

Two Track Process

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

AF&PA believes that the two track approach offered by the utility industry for protecting fish and organisms on a population basis is sound. AF&PA supports this general concept, in part, based on the considerable EPRI and UWAG <fn4> expertise in this field.

Footnotes

4 Utility Water Action Group is a voluntary, ad hoc, non-profit, unincorporated group of 118 electric utility systems, which own and operate over fifty percent of the nation's total generating capacity. The Edison Electric Institute, the American Public Power Association, and the National Rural Electric Cooperative Association are also UWAG members.

EPA Response

See preamble section V for discussions on the basis for today's final rule and section VII for discussions on its implementation.

Comment ID 316bNFR.516.019

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

AEI is not adequately defined. AF&PA has considered the substantial work conducted by EPRI to better define AEI, and UWAG's comments on this subject. AF&PA believes that UWAG's comments and the EPRI work describe a better system for defining aquatic health through fish population studies. AF&PA strongly endorses the concept of determining fish and aquatic health and vitality based upon fish population—rather than on the possible arbitrary determination of AEI with the impingement or entrainment, in the extreme, of one fish.

EPA Response

See response to comment 316bNFR.507.004.

Comment ID 316bNFR.516.020

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

EPA's definition of AEI is too loose and will lead to open-ended determinations of AEI. Different species warrant different levels of protection. There may be no need to protect nuisance species, for instance, while other species that are important in the food web or have special recreational or commercial value might warrant special protection. Invasive aquatic species are a major problem in lakes, rivers and harbors—protecting them is not called for under this section of the Clean Water Act.

EPA Response

EPA believes that cooling water intakes are basically non-discriminatory with respect to what is impinged or entrained. However, EPA agrees that a clear understanding of how EPA interprets adverse environmental impact is critical to today's rule, particularly given the underlying objective of 316(b) to establish best technology available for minimizing adverse environmental impact. EPA also recognizes that consensus over a single definition of adverse environmental impact among scientists, lawmakers, environmentalists, and regulators has yet to be reached. For these reasons and for the purposes of today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.). Protection of nuisance species is not included in the above list of adverse environmental impacts.

Comment ID 316bNFR.516.021

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

The utility industry has offered a sound technical case for recognizing the biological compensation factors in waterbodies in a wide variety of fish species. AF&PA agrees with the utility industry that AEI must be defined more clearly since the statute requires minimization of AEI. AF&PA strongly discourages any possible repeat of the perplexing problem from the Superfund program where cleanup decisions were unclear due to fundamental inconsistencies in the ARARs <fn5> and EPA policies. Certainty as to what is AEI is fundamental to the future success of the Section 316(b) program. It is also essential that state permit writers have a clear understanding of AEI.

Footnotes

5 able or Relevant and Appropriate Requirement (CERCLA, Section 121).

EPA Response

See response to comment 316bNFR.029.013.

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses, and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

EPA agrees that permit writers should have a clear understanding of what is meant by AEI and how it can be measured accurately, objectively, and relatively quickly. EPA's interpretation of AEI is discussed in section VI.B.2.a of the preamble. Detailed information describing how AEI can be assessed and measured will be provided in forthcoming guidance.

Comment ID 316bNFR.516.022

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

AF&PA believes an excessive cost burden for New Facilities would result from an interpretation of closed cycle cooling that does not recognize the reuse of cooling water at process water applications in manufacturing facilities. If the definition of closed cycle cooling does not recognize the reuse of cooling water as process water, the cost to heat additional surface water for process applications will likely exceed, perhaps by a wide margin, the industry's cost to install technologies designed to reduce impingement and entrainment.

EPA Response

The final rule definition of cooling water provides that heated cooling water that is subsequently used in a manufacturing process is considered process water for the purposes of calculating the percentage of a new facility's intake flow that is used for cooling purposes in § 125.81(c).

Comment ID 316bNFR.516.023

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

If the energy losses due to abandoning the use of waste heat of process water heating were added to the associated costs in the New Facility rule, the cost could be substantially higher, possibly by several million dollars. Thus, the New Facility rule could be a significant and perhaps insurmountable hurdle for new construction because of the additional heating costs for process purposes.

EPA Response

See responses to comments 316bNFR.007.005, 316bNFR.012.012, and 316bNFR.062.033.

Comment ID 316bNFR.516.024

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 12.22

Potential for Additional Measures for Unique Situations (Great Lakes)

AF&PA does not believe that the Great Lakes region has any special ecological requirements for entrainment and impingement. However, if a state in the Great Lakes or elsewhere believed there was something unique about the placement of a cooling water intake structure and the local geography, under state law the state could require more strict requirements at that location.

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.516.025

Subject Matter Code	23.4
Other Requirements (UMRA, RFA, SBREFA)	

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

In the NODA, EPA asked for comments on the Unfunded Mandates Act. The forest products industry believes that no environmental regulatory program can work without the practical implementation concerns of the states being addressed. AF&PA believes that more state agencies should be involved in the development of the Existing Facility rule than were involved in the New Facility rule. The “unfunded mandates,” permitting, and unintended environmental consequences should be addressed by state regulators when the EPA deals with these issues in the Existing Facility rule. AF&PA regrets that more states were not involved in the New Facility proposed rule. States are critical for discussions of what constitutes AEI, restoration, and the selection of realistic mitigation measures.

EPA Response

The commenter states that "more state agencies should be involved in the development of the Existing Facility rule than were involved in the New Facility rule." EPA will determine the extent of State participation in development of a rule for existing facilities during its planning for that rule. The Agency does note, however, that during the development of this rule, EPA actively sought the views of States.

EPA also held two public meetings in the summer of 1998 to discuss issues related to the section 316(b) rulemaking effort. Representatives from New York and Maryland attended the meetings and provided input to the Agency. The Agency also contacted Pennsylvania and Virginia to exchange information on this issue. In addition, EPA Regions 1, 3, 4, and 9 served as conduits for transmittal of section 316(b) information between the Agency and several States. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials. More recently, EPA met with industry, environmental, and State and Federal government representatives, during May, June, and July 2001 to discuss regulatory alternatives for the new facility proposal. A summary of the concerns raised during consultation and EPA's response to those concerns is provided in the record of this rule. See Section X.E in the preamble for today's rule for further information.

EPA cannot comment on issues regarding the existing facility rule at this point.

Comment ID 316bNFR.516.026

Subject Matter Code 11.0

Best Technology Available-Location

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

The NODA called for comments on Endangered Species Act (ESA) and Essential Fish Habitat. However, the docket contained no analyses of the effect of Section 316(b)'s proposed New Facility rule on species listed under ESA or on Essential Fish Habitat (EFH). Therefore, AF&PA is unable to provide comments at this time. In the event that such analyses are later provided to the EPA or by other agencies, AF&PA reserves the right to comment at a later time. We caution that the EFH program and the designations in the record far exceed the statutory authority provided NMFS by Congress in the Magnuson-Stevens Fisheries Conservation and Management Act. The EFH program is limited to an information process between federal agencies. To the extent NMFS interacts with the section 316(b) program from this perspective, that agency will be acting in a manner consistent with Congressional intent. However, if NMFS expects EPA to act in any specific manner as a result of NMFS' comments or EFH policies, NMFS is exceeding its authority and EPA would be under no obligation to comply. Moreover, the EFH designations approved by NMFS, including the ones contained in the record, far exceed the statutory standard of "essential" or "necessary." EFH should not include any and all habitat nor should it include habitat per se. NMFS, however, designated virtually 100% of existing habitat as "essential," which exceeds the authority granted under the Magnuson-Stevens Act and is otherwise arbitrary and capricious.

EPA Response

This comment relates to the authority of NMFS under the Essential Fish Habitat program. It does not pertain to the proposed Section 316(b) regulations. Thus, while no response is required, EPA notes the comment.

Comment ID 316bNFR.516.027

Subject Matter Code MISC

Miscellaneous Comment

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

AF&PA has special concerns about the potential consequences on cogeneration in the Forest Products Industry of the Section 316(b) proposed rule for New Facilities. A cogeneration unit is energy efficient because the thermal energy used to produce electricity is also used for other processes. Congress, the Administration and states have demonstrated a strong interest in encouraging cogeneration, an interest also reflected in EPA regulations, such as NSPS for electric utility steam generating units in 40 C.F.R. Part 60 Subpart Da and rules for the acid rain program in 40 C.F.R. Part 72. The forest products industry is the nation's largest producer and user of cogenerated energy, with most cogenerated energy produced at its own mills. <fn6> The industry expects that cogeneration plants will continue to be an essential source of its energy. AF&PA requests that EPA include special provisions dealing with cogeneration units and not discourage additional development of this efficient and environmentally preferable method for producing power, at a time when Congress, the Administration, and state energy policies are designed to encourage cogeneration and maintain stable energy supply and prices.

Footnotes

6 Energy Information Administration (DOE), "Manufacturing Consumption of Energy 1994", DOE/EIA-0512 (94), December 1997.

EPA Response

Please see response to comment 316bNFR.012.013.

Comment ID 316bNFR.516.028

Subject Matter Code EXIST

Existing Facility Rule

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

EPA correctly notes that the circumstances surrounding the cooling water intake structures of New and Existing Facilities are very different and the requirements applicable to each must account for those differences. However, EPA's proposed rule contains many examples where the definitions for New versus Existing Facilities must be clarified to prevent confusion in the future. This is particularly important for future cogeneration needs where cooling water intakes might need to be moved or built at existing facilities to provide adequate water for energy generation.

EPA Response

Today's final rule applies only to new facilities. See the preamble to today's final rule.

Comment ID 316bNFR.516.029

Subject Matter Code MISC

Miscellaneous Comment

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

EPA needs to ensure that new cogeneration facilities constructed at Existing Facilities are not considered "New Facilities." At a minimum, the agency should build sufficient flexibility into the new source standards to accommodate the special issues that cogeneration units present.

EPA Response

EPA did not consider it appropriate to blanketly exempt new cogeneration facilities constructed at existing facilities from being considered a new facility. See response to comment 316bNFR.012.013.

Comment ID 316bNFR.516.030

Subject Matter Code MISC

Miscellaneous Comment

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Since a cogeneration unit must be located close to an industrial facility, requirements for the location of new cooling water intake structures and limits to a certain percentage of stream flow, for example, could effectively prevent the use of cogeneration at a particular existing industrial or agricultural facility. Meeting a required minimum cooling water recirculation rate may be impossible or at least undesirable for a cogeneration unit, where cooling water from the cogeneration unit may subsequently be reused as process water by the industrial facility (for improved energy efficiency) and then treated and discharged.

EPA Response

Based on EPA's analysis, the proportional flow limit would not, under most circumstances, prevent the use of cogeneration at a particular existing industrial or agricultural facility. EPA analyzed the potential siting implications of the proportional flow requirements and determined that within the United States approximately 131,147 river miles have sufficient flow to support the water usage needs of large manufacturing facilities withdrawing up to 18 MGD of water without exceeding the proportional flow limitations in this rule.

EPA recognizes the environmental benefits of reusing cooling water for process needs and vice versa. Hence, EPA has revised the definition of cooling water to consider heated cooling water that is subsequently used in a manufacturing process to be considered process water for the purposes of calculating the percentage of a new facility's intake flow that is used for cooling purposes in § 125.81(c). If less than 25 percent of the water withdrawn is used for cooling purposes then the facility is not subject to this rule. Therefore, a facility that may subsequently reuse cooling water from its cogeneration unit as process water potentially may not be subject to this rule or at the very least gets credit for the portion of the cooling water that is reused and must only recirculate the cooling water that is not reused as process water.

Comment ID 316bNFR.516.031

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

The total capital cost estimated for the New Facility rule might be only several million dollars for only two theoretical greenfield facilities that might be constructed over the next 10-20 years if waste heat costs related to closed cycle cooling were not considered. At this point, annual operating costs have not been estimated for New Facilities. In addition to the technology installation costs, the EEA estimates that initial permitting costs will be on the order of $50,000 for the cooling water intake structure requirements per permit.

EPA Response

EPA notes that the subject of cooling water and process water reuse has been addressed for the final rule, so as to preclude costs associated with waste heat and closed-cycle cooling. See response to comment #316bNFR.062.018. Therefore, the total capital cost estimate provided by the commenter would be relevant in this case. Because the commenter only provides a general cost estimate, EPA is unable to directly compare it to the estimates for the final rule. However, generally, the commenter's capital cost estimates agree with EPA's compliance estimates for projected new facilities in the forest products industry.

EPA notes, for the record, that the Agency clearly has estimated annual operating costs for new facilities. Therefore, the cryptic statement that "at this point, annual operating costs have not been estimated" must only mean that the commenter has not estimated the operating costs.

Comment ID 316bNFR.516.032

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

The proposed New Facility rule could result in a sizable increase in conventional air pollutants (including SO2, NOx, PM) as well as CO2, a greenhouse gas, from new energy produced for process purposes that are now handled by the water that is used for both process and cooling. Just as important, if implemented, the changes suggested by AF&PA would preclude numerous unintended adverse environmental impacts that would result from the rule as currently drafted. These adverse environmental impacts must be considered when determining AEI.

EPA Response

See response to comment 316bNFR.062.016.

Comment ID 316bNFR.516.033

Author Name Jerry Schwartz

Organization American Forest & Paper Assn.

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

AF&PA appreciates the opportunity to comment on the NODA. AF&PA's suggested changes would minimize unnecessary expenditures of mill resources at a time when the industry is facing a challenging international competitive environment, substantial severe increases in energy costs, and continued job losses.

EPA Response

EPA appreciates the comment and notes that the topics of energy costs are addressed in response to comment #316bNFR.062.018 and the economic considerations are addressed in response to comment #316bNFR.516.002.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Alan Hubbard

On Behalf Of:

Florida Dept. of Environmental
Protection (FDEP)

Author ID Number:

316bNFR.517

Note

No comments entered, as these comments were replaced by a later submission. Comments for this author are coded under 316bNFR.601.

Comment ID 316bNFR.517.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Alan Hubbard

Organization Florida Dept. of Environmental Protection (FDEP)

No comments entered, as these comments were replaced by a laterr submission. Comments for this author are coded under 316bNFR.601.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kerry Whelan

On Behalf Of:

Reliant Energy

Author ID Number:

316bNFR.518

Note

Fully supports the comments made by UWAG (316bNFR.524) and EPRI (316bNFR.535)

Comment ID 316bNFR.518.001

Author Name Kerry Whelan

Organization Reliant Energy

Subject Matter Code OPP

General Statement of Opposition

We have numerous development projects and acquisitions throughout the country and the proposed revisions to the cooling water intake structures (CWIS) regulations could result in significant negative impacts to these planned future development activities without providing the benefit of additional environmental protection.

EPA Response

EPA believes that the final rule will not result in negative impacts on the future development activities and will result in significant environmental benefits See the preamble and the Economic Analysis for a discussion of the economic impacts and benefits of the rule.

Comment ID 316bNFR.518.002

Subject Matter Code 10.16

Two Track Process

Author Name Kerry Whelan

Organization Reliant Energy

EPA's NODA proposes modifications to the Two-Track Approach offered by UWAG in their November 9, 2000 comments to the proposed nile. These modifications create additional BTA restrictions that are not documented to provide any additional protection to the environment. EPA proposes the addition of dry cooling as a BTA for the modified Track One. Dry cooling not only has a significantly higher capitol cost, but also has a much higher energy penalty. Further, dry cooling is not practical under all climatic conditions, generally restricting practicability to dryer climates. Therefore, due to the more restrictive application and potential adverse environmental effects to offset the energy penalty of this particular technology, we do not believe it represents a viable BTA option.

EPA Response

Today's rule does not contain performance standards commensurate with dry cooling technologies. See preamble section V for further discussions on why EPA rejected adopting dry cooling as best technology available for minimizing adverse environmental impact.

Comment ID 316bNFR.518.003

Subject Matter Code 10.16

Two Track Process

Author Name Kerry Whelan

Organization Reliant Energy

The UWAG Two-Track Approach offers flexibility in the development of new facilities and encourages developnient of new and innovative intake technologies. Each site has unique ecological characteristics that need to be considered and the site-specificity of the Two-Track Approach is better equipped to address these characteristics. In addition, this approach provides the opportunity to conduct baseline monitoring on a case-by-case basis rather than requiring it for every facility whether or not it is necessary. A one-year study is not an adequate length of time to accurately illustrate the potential for AEI, yet it is too long a time to allow competitive placement of new facilities. The direct and indirect costs associated with this type of study are considerable.

EPA Response

EPA agrees that a two-track approach offers both certainty and flexibility while streamlining the permitting process for the permitting authorities. EPA has included the need to look at existing data and maybe compiling additional data prior to the beginning of operations of a new facility only in Track II. EPA has not required pre-operational studies in Track I because it believes the technology it requires will be protective and minimize adverse environmental impact as required by section 316(b) of the CWA. However, EPA is requiring verification monitoring after the facility begins operation, in order to make sure the technology implemented is operating as designed and the goals of today's rules being attained.

See preamble section V and section VII for more discussions on today's two-track approach and its implementation, respectively.

Comment ID 316bNFR.518.004

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Kerry Whelan

Organization Reliant Energy

Regardless of the approach taken, a clear definition of Adverse Environmental Impact (AEI) needs to be established.

EPA Response

See response to comment 316bNFR.507.004.

Comment ID 316bNFR.518.005

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Kerry Whelan

Organization Reliant Energy

The population and community-level approach is able to determine impact to the community and its effect on the ecosystem. As endorsed by UWAG, we believe EPA should implement a definition of AEI that is consistent with the principles used in fishery management science. These principles have been in practice for years.

EPA Response

Please see responses to comments 316bNFR.510.006 and 316bNFR.068.037.

Comment ID 316bNFR.518.006

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Kerry Whelan

Organization Reliant Energy

In an estuarine environment, a decrease in the high density of eggs and larvae does not necessarily translate to AEI. EPRI (NODA comments) cited studies that have indicated a decrease in the density of eggs and larvae in the estuarine environment leads to a decrease in competition and an increase in survival. This density-dependence, compensation, is a property of population regulation, which determines compensatory reserve (a level at which a population is sustainable). Fish population studies have not been able to clearly demonstrate that power plant CWIS can alone decrease a fish population's compensatory reserve. EPRI and UWAG present further details in their comments to the NODA.

EPA Response

Please see response to comment 316bNFR.524.012.

Comment ID 316bNFR.518.007

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Kerry Whelan
Organization Reliant Energy

We reiterate our comments from November 9, 2000 that the intake flow limit of 2 MGD and 0.5 fps flow velocity have been arbitrarily set without sufficient evidence to show a direct relationship between flow, flow velocity and AEI.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 15 MGD, 32 percent of the manufacturers, 29 percent of the nonutilities, and 50 percent of the utilities would be covered, as would 97.3 percent of the total flow. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. While at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

In addition, the final rule definition of cooling water specifies that heated cooling water that is subsequently used in a manufacturing process is considered process water for the purposes of calculating the percentage of a new facility's intake flow that is used for cooling purposes in § 125.81c (i.e., the 25 percent cooling water use threshold).

For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.518.008

Author Name Kerry Whelan

Organization Reliant Energy

Subject Matter Code 13.3

Request for Comment: Consideration of Site-specific Determinations

After 30 years of 316(b) monitoring and studies, there is limited evidence showing a correlation between the above or, for the most part, of any substantial impact associated with intake operations at existing facilities: There has been evidence demonstrating an increase in biofouling when flow velocity drops below 1.0 fps. An increase in biofouling would lead to an increase in the use of biocides, which further increases the mortality rate of entrained organisms or to an increased energy penalty and associated offsite effects.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.023.008 for information regarding biofouling issues.

Also see 316bNFR.022.002, 316bNFR.022.007, 316bNFR.503.005, 316bNFR.028.031, and 316bNFR.063.010.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Gary R. Aydell

On Behalf Of:

Louisiana Dept. of Environmental
Quality (LDEQ)

Author ID Number:

316bNFR.519

Comment ID 316bNFR.519.001

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality (LDEQ)

As per our August 10, 2000 comments, LDEQ is opposed to regulating the design and construction of cooling water intake structures through the NPDES program. As pointed out in our comments, the Corps of Engineers already has the opportunity to regulate the construction of all surface water intake structures and we believe another agency does not need to regulate the same activity.

EPA Response

Section 316(b) specifically provides, "the location, design, construction, and capacity of cooling water intake structures shall reflect the best technology available..." (emphasis added). Section 316(b) is the only provision of the Clean Water Act that specifically addresses the intake of water. The commands of Section 316(b) are supplemental to authorities administered by the Corps of Engineers, including Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and NEPA. See response to comment 316bNFR.068.156.

Comment ID 316bNFR.519.002

Subject Matter Code MISC

Miscellaneous Comment

Author Name Gary R. Aydell

Organization Louisiana Dept. of Environmental Quality (LDEQ)

Another reason we are opposed to additional regulations on surface water intake structures is that it will cause facilities to lean more towards the use of ground water. Ground water consumption has become a major issue in Louisiana and we believe anything that would drive facilities to use ground water instead of surface water in contrary to the will of the Louisiana legislature.

EPA Response

Please see response to comment 316bNFR.045.002.

Comment ID 316bNFR.519.003

Author Name	Gary R. Aydell
Organization	Louisiana Dept. of Environmental Quality (LDEQ)

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

If EPA does promulgate rules to regulate cooling water intake structures, we encourage EPA to provide for flexibility with respect to the size of rivers and lakes and for flexibility with regard to background studies before construction. The flexibility for the size of rivers is important to Louisiana because of the Mississippi River compared to smaller rivers and bayous. The potential impact of a surface water intake on the Mississippi River would be considerably different than the potential impact of a similar intake structure on a much smaller river.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

James R. Wright, Jr.

On Behalf Of:

Tennessee Valley Authority (TVA)

Author ID Number:

316bNFR.520

Comment ID 316bNFR.520.001

Author Name James R. Wright, Jr.

Organization Tennessee Valley Authority (TVA)

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

In response to EPA questions about the use of biological assessments and biocriteria, TVA has developed both community-level and population—level biocriteria which TVA, a number of regulators, and a number of stakeholders find useful, both as a means to characterize the health and integrity of communities and sport fish populations, (including application as a pre-operational assessment tool), and as a tool for assessing the stressors which are or may be causing adverse impact. TVA would be glad to discuss our experience with you.

EPA Response

Please see response to comment 316bNFR.511.005.

Comment ID 316bNFR.520.002

Author Name James R. Wright, Jr.

Organization Tennessee Valley Authority (TVA)

Subject Matter Code 19.2

Baseline Biological Characterization Study

In response to EPA's question regarding pre-operational and operational monitoring as part of the Fast-Track alternative, TVA believes that no pre-operational monitoring is indicated or should be required. The Fast-Track technologies are so highly, and in many cases overly, protective that no such pre-operational source waterbody monitoring is necessary--particularly given the fact that state and federal requirements for the protection of threatened and endangered species and their critical habitats are in place, as are other state-specific requirements, as well as the opportunity for the permit writer to demonstrate other site-specific conditions under which such technologies would not prevent Adverse Environmental Impact. Operational monitoring should be required if and as necessary (only) to document the performance of the installed technology, but no source waterbody monitoring would be necessary. Pre-operational or un-necessary operational monitoring would diminish the appeal and efficacy of the Fast-Track alternative.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.520.003

Subject Matter Code	10.16
	Two Track Process

Author Name James R. Wright, Jr.

Organization Tennessee Valley Authority (TVA)

With regard to EPA's proposed modifications to the Fast-Track alternative, TVA is opposed (as stated and expounded upon in previously submitted comments) to requirements for technologies which are redundant in terms of adequately addressing the two potential issues of entrainment and impingement.

EPA Response

EPA has reviewed the requirement of additional technologies and has included specific conditions where such additional technologies would be required so to address these concerns. See, for example, 40 CFR 125.84(b)(4).

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Scott Davis

On Behalf Of:

Pinnacle West Capital Corp. (PNW)

Author ID Number:

316bNFR.521

Comment ID 316bNFR.521.001

Subject Matter Code	12.1
	Freshwater Streams/Rivers

Author Name Scott Davis

Organization Pinnacle West Capital Corp. (PNW)

EPA's proposal retains the previously proposed requirement for a design intake flow of >5% of the source water mean annual flow and (underline added) >25% of the source water low flow over the last 10 years for the lowest one week period. PNW is concerned that the proposal could adversely impact new facilities constructed on surface water in the southwestern United States for the following reasons.

In the drier climate of the southwestern United States the flows in the rivers and streams vary significantly from year to year depending on annual precipitation. In order to assure adequate water supplies dams control the flows in most rivers in the region. As a consequence, large variations in the volume of water in the rivers often result from management of the upstream uses such as power production, irrigation, etc. These "man-induced" variations in flow rates are beyond the control of a facility that may be withdrawing cooling water from the water source. Under EPA's proposal the facility could be required to regularly adjust intake flow in order to comply with the >5% flow requirement. This could have adverse impact on power production.

EPA Response

EPA agrees that certain areas of the country experience great extremes in instream flow from year to year. Under ideal conditions, 10 years of instream flow data would be used to accurately calculate the mean annual flow of the source water body. EPA believes this amount of data is sufficient to account for any non-seasonal climatological variations which may result in extremely low or extremely high stream volumes.

The commenter notes the high potential for variability in instream flows in certain locations of the southwestern United States due to draw downs from dams along the region's major river systems. EPA believes this uncertainty, if true, would be a consideration in the siting of any new facility at such a location, regardless of any standards promulgated under today's rule. The lack of a reliable source of cooling water would likely be prohibitive to efficient facility operation and discourage construction of a facility with a heavy dependence on surface water at such a site. This is confirmed by EPA's record of cooling water use at new facilities.

Today's final rule establishes a design intake flow criterion for new facilities. For facilities withdrawing water from a freshwater stream or river, the design intake flow cannot exceed 5% of the source water's mean annual flow. This standard is not applicable to the daily operation of a facility's cooling water intake structure. That is, a facility is not expected to constantly monitor the instream flow of the source water and adjust its water intake accordingly. EPA believes the design intake flow standard for riverine facilities affords a level of protection for the source water body acceptable under most, if not all, stream conditions. In extreme circumstances, the permitting authority may implement additional measures of protection.

Comment ID 316bNFR.521.002

Subject Matter Code 12.11

5% Mean Annual Flow

Author Name Scott Davis

Organization Pinnacle West Capital Corp. (PNW)

A second concern relates to the ability of a facility to operate in compliance with the proposed intake flow rate under the conditions noted above. A facility may have designed its intake flow rate based on the most recent mean annual flow rate data and operate within compliance of the proposed intake flow requirement unless and until the flow rate subsequently changes significantly, i.e. decreases. In this circumstance the facility may unintentionally withdraw more than 5% of the mean annual flow in a given period of time without knowing that it was out of compliance.

EPA Response

Today's final rule establishes a design intake flow criterion for new facilities. For facilities withdrawing water from a freshwater stream or river, the design intake flow cannot exceed 5% of the source water's mean annual flow. This standard is not applicable to the daily operation of a facility's cooling water intake structure. That is, a facility is not expected to constantly monitor the instream flow of the source water and adjust its water intake accordingly. EPA believes the design intake flow standard for riverine facilities affords a level of protection for the source water body acceptable under most, if not all, stream conditions. In extreme circumstances, the permitting authority may implement additional measures of protection as permitted by Section 125.85.

Comment ID 316bNFR.521.003

Subject Matter Code 12.1

Freshwater Streams/Rivers

Author Name Scott Davis

Organization Pinnacle West Capital Corp. (PNW)

In order to address these concerns PNW respectfully requests that the EPA consider the following alternatives. First, EPA should consider employing a longer averaging period to determine the mean flow in the source water, e.g. 5-years rather than annually. PNW believes that a longer averaging period would provide a more accurate, steady state estimate from which the 5% design flow rate could be determined. A second alternative would be to allow the flow rate to be determined on the basis of either the mean annual flow or 25% of the source water 10-year low flow. In some cases a new facility may be able to meet the 10-year flow requirement, but not the mean annual flow requirement.

EPA Response

EPA has opted not to include the 25% 7Q10 standard in today's final rule. EPA believes 5% mean annual flow requirement for freshwater rivers and streams achieves an acceptable level of protection for the source water while remaining economically practicable and technologically reasonable for new facilities.

Under ideal conditions, 10 years of instream flow data would be used to accurately calculate the mean annual flow of the source water body. EPA believes this amount of data is sufficient to account for any non-seasonal climatological variations which may result in extremely low or extremely high stream volumes.

Comment ID 316bNFR.521.004

Subject Matter Code	12.1
Freshwater Streams/Rivers	

Author Name Scott Davis

Organization Pinnacle West Capital Corp. (PNW)

Not withstanding the above, PNW requests the EPA consider one other issue related to intake volume. PNW believes that if a facility owns water rights that exceed the proposed >5% volume intake limitation, the facility should be allowed to exercise its entire water right.

EPA Response

EPA promulgates today's final rule under authority of the Clean Water Act and cannot make a determination on the situation presented by the commenter.

EPA believes that the rule does not effect a taking. This rule is only a preliminary step; it is not ripe until applied to a particular person in an NPDES permit. Further, for new facilities, they would not have a reasonable expectation that they would be able to use water in a manner that violates this rule once this rule is promulgated.

A takings analysis is very fact-specific; however there are many questions that determine whether an action is a taking, such as:

1. Does the action prevent use of the "parcel" (i.e. is it ripe)?
2. Have state avenues for obtaining compensation been exhausted?
3. Does the action completely eliminate the use of the parcel?
4. Could use have been prohibited under principles of property law and nuisance law?

All of these and other questions would apply at the subsequent permit issuance.

Comment ID 316bNFR.521.005

Subject Matter Code 10.16

Two Track Process

Author Name Scott Davis

Organization Pinnacle West Capital Corp. (PNW)

PNW supports the proposal offered by the Utility Water Activity Group (UWAG) and encourages the EPA to consider the alternatives outlined in the UWAG proposal. Under UWAG's proposal, facilities would have the ability to exercise a fast track permitting option, or engage in a site-specific study to determine the best technology available for the site. The latter is desirable, as there may be circumstances in which an intake velocity greater than the 0.5fps limit proposed by EPA could be employed without increasing the mortality of aquatic wildlife beyond acceptable limits.

EPA Response

Today's rule adopts a two-track approach which follows the commenter's suggestion that this rule safeguards the ability of a new facility to exercise a fast-track option or to engage in a site-specific study and determine which technologies would work best for that site under that new facility's conditions. See preamble section V and section VII for discussions on today's two-track approach and its implementation issues, respectively.

Comment ID 316bNFR.521.006

Subject Matter Code	7.3
Definition: Waters of the US	

Author Name Scott Davis

Organization Pinnacle West Capital Corp. (PNW)

Applicability of Proposed Standards to Man-Made Cooling Water Impoundments

EPA's proposal appears to apply to any new cooling water intake structure used to withdraw water from Waters of the U.S. PNW does not believe the proposed requirement should apply to man-made cooling water impoundments, which are physically separate and hydraulically isolated from rivers and lakes, and which for a variety of reasons may be designated a Water of the U.S. PNW does not feel the proposed requirements should apply in situations where the following factors come into play.

First, the source of the cooling water is a man-made surface impoundment, which is constructed solely for the purpose of providing cooling water for the facility. This would apply even if the surface impoundment is designated a Water of the U.S. for reasons such as recreation. In this circumstance, any aquatic wildlife present in the water presumably would have been introduced for recreational purposes and the aquatic species did not exist prior to construction of the facility. Second, the man-made surface impoundment receives all of its water from a groundwater source and doesn't use any surface water, nor is it connected to any other lake or river or other source of surface water.

Under these circumstances, and possibly other scenarios for other unique situations, PNW does not believe the proposed standards should apply, and respectfully requests that EPA clarify its position on this issue.

EPA Response

See Response to Comment 316b.NFR.068.151.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Maureen F. Vaskis & Mark F. Strickland

On Behalf Of:

PSEG Power LLC

Author ID Number:

316bNFR.522

Comment ID 316bNFR.522.001

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

PSEG submitted detailed comments in response to the proposed rule that were focused primarily on the role of voluntary conservation measures in the Section 316(b) program. This issue is raised implicitly in the NODA because the resolution of many questions addressed directly by the NODA will have a significant impact on State permitting agencies' flexibility to consider voluntary conservation measures. In this letter, PSEG responds to several of these legal and policy issues that bear on the role of conservation measures within the Section 316(b) program.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.522.002

Subject Matter Code OPP

General Statement of Opposition

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

This rulemaking presents an opportunity for the Agency to preserve and foster some of the most important features of the Section 316(b) permitting system that have been in place for many years: flexibility for States to tailor requirements to the needs of particular watersheds; encouragement of creative programs for restoring and enhancing diverse ecosystems; and authority to approve cost-effective approaches for reducing or eliminating potential adverse environmental impacts. The rule also offers an excellent opportunity to demonstrate that EPA is serious about building into its programs the flexibility that will be necessary to provide reasonable alternatives to regulatory actions that have adverse energy effects, as required by the President's recent Executive Order 1321 (May 18, 2001).

The August, 2000 proposed rule suggested, however, that the Agency may be planning to take a radically different approach, one with which PSEG emphatically disagrees. Instead of endorsing the site-specific approach that has been employed successfully by permitting authorities for nearly thirty years, the proposed rule would impose national, technology-based requirements. Within four broad categories of water bodies, and depending on the location of the new intake structure, a standard set of requirements would apply. This abandonment of the site-specific approach would preclude a permit applicant from undertaking a voluntary conservation project to reduce or eliminate the need for the technologies that EPA's proposed program would require. The Agency's proposal was inconsistent with the statutory mandate, counter to decades of administrative and legal precedents, and represented fundamentally bad policy.

Fortunately, in the preamble to the proposed rule, and again in the NODA, the Agency has identified a wide range of regulatory options. Some of these options would allow EPA to reassess key issues and to promulgate a final rule that will preserve and improve the most valuable aspects of the current program. As we explained in PSEG's comments on the proposal, it is imperative — both legally and from the standpoint of efficient, science-based decision making — that EPA abandon the approach of the proposal and pursue its other, more appropriate options.

EPA Response

See response to comment # 316bNFR.069.002and the preamble to the final rule.

Comment ID 316bNFR.522.003

Subject Matter Code EXIST

Existing Facility Rule

Author Name Maureen F. Vaskis & Mark F. Strickland

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It is essential to recognize that this rulemaking, although directly affecting only new facilities, could have a significant impact on the Agency's subsequent regulation aimed at permitting for existing facilities. In particular, EPA's interpretation of key concepts contained within Section 316(b) likely would transcend this rule, and therefore may restrict the Agency's flexibility in regard to regulation of existing facilities. The chief among these concepts are: (1) the degree of uniformity (versus site specificity) allowed by the statute; (2) the environmental (versus technology) focus of Section 316(b); and (3) the manner in which the rule defines and addresses "adverse environmental impact."

EPA Response

EPA believes that even in a technology-based approach, there is ample discretion to make different decisions for existing facilities, particularly because unlike new facilities, most of which were planning to install closed cycle cooling, existing facilities often do not have these technologies in place and would have to retrofit technology. These retrofit costs, in general, make the same requirements much higher for existing facilities than for new facilities. See the preamble to today's rule.

Comment ID 316bNFR.522.004

Author Name Maureen F. Vaskis & Mark F. Strickland
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Subject Matter Code 10.06
Request for Comment: Case-by-Case Framework Approach

Over the past thirty years, EPA has consistently recognized that ignoring site-specific differences and mandating a predetermined set of technologies was neither lawful nor the best way to achieve the objectives of Section 316(b) — minimizing the potential adverse environmental impacts that may be caused by a CWIS. Indeed, EPA and the States often have found that site-specific methods of reducing or eliminating potential adverse environmental impacts -- through the use of conservation measures, technologies, or a combination of both -- was the most appropriate option. In a number of instances, EPA and the States have explicitly recognized the broad environmental benefits that conservation measures can confer on an ecosystem.

In order to implement a program consistent with the statutory objectives, we believe the Agency must establish a framework that allows consideration of site-specific factors. This is the framework best-suited to identifying AEI and determining how to eliminate or minimize it. Indeed, EPA has long recognized that such an approach is required. One of EPA's original Section 316 guidance documents noted that case-by-case determinations were appropriate due to "the highly site-specific cost versus benefits characteristics of available technology." (USEPA, Office of Air and Water Programs, Effluent Guidelines Div., Development Document for Proposed Best Technology Available for Minimizing Adverse Environmental Impacts of Cooling Water Intake Structures at 145 (Dec. 1973.)) Subsequent EPA guidance confirmed this approach, stating that case-by-case determinations should be made because "the optimal combination of measures effectively minimizing adverse impact on the biota is site and plant specific." (Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b), P.L. 92-500 (1977) at 14.) The 1977 Guidance affirmed that the site-specific approach is warranted because "the exact point at which adverse aquatic impact occurs at any given plant site or water body segment is highly speculative and can only be estimated on a case-by-case basis by considering the species involved, magnitude of the losses, years of intake operation remaining, ability to reduce losses, etc." Id. at 11. The continuing applicability of the 1977 USEPA Guidance was recently affirmed in the memorandum "Implementation of Section 316(b) in National Pollutant Discharge Elimination System Permits, " from Michael B. Cook, Director, Office of Wastewater Management, to Water Division Directors , Region I-X, and State NPDES Directors, dated December 28, 2000.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule for information on why EPA is not adopting a case-by-case approach for today's rule for new facilities.

EPA disagrees that it has mandated a set of technologies. Instead, EPA is promulgating a set of performance standards based on specified technologies. This is consistent with how EPA establishes effluent limitations guidelines and new source performance standards under Sections 310, 304, and 306 of CWA.

Also, EPA is allowing certain measures under Track II that can achieve comparable performance to Track I. See Section V.B. in the preamble to today's rule.

Comment ID 316bNFR.522.005

Subject Matter Code	23.3
State Burden and Costs for Permitting Activities	

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Organization PSEG Power LLC

The NODA indicates that "many states have expressed concern about adopting a site-specific approach for new facilities which, in their view, would require a burdensome expenditure of resources...." 66 Fed. Reg. at 28865. We find it hard to believe that these States would prefer a scheme that imposes technology requirements without reference to whether adverse impacts actually exist in the affected environment, whether the AEI can be attributed to a particular CWIS and, if so, how it could be reduced or avoided in the most cost-effective manner possible. This would place administrative convenience ahead of the legal requirement to identify AEI before imposing BTA requirements. It also would eliminate any flexibility for permitting authorities to fashion cost-effective measures that would best benefit their ecosystems. In the end, we believe there are far better ways to address potential administrative burdens by structuring the rule to facilitate sound decision-making that actually complies with the mandates of the statute.

EPA Response

EPA believes that for new facilities it is reasonable to measure AEI in terms of reduction in impingement and entrainment. See response to comment 316bNFR.068.007 and the preamble to the final rule.

EPA believes that the two track approach established in the final rule provides a consistent and flexible framework for implementing technologies to minimize adverse environmental impacts associated with the construction and operation of CWISs. Facilities choosing Track I will comply with a uniform set of BTA requirements, which EPA believes will minimize impingement and entrainment of aquatic organisms. The technologies that form the basis for this track are commercially available, economically practicable and have been demonstrated to be effective in reducing impingement and entrainment to minimize adverse environmental impact. Facilities may also opt for Track II, under which they may demonstrate to the permitting authority that alternative technologies will minimize impingement and entrainment to a comparable degree to that which would be achieved by Track I. Track II facilities are expected to choose alternative technologies based on site-specific environmental assessments and the individual requirements of that facility. The two track approach provides new facilities with a well-defined set of requirements that constitute BTA for minimizing adverse environmental impact and can be implemented relatively quickly. The two track approach also provides flexibility to operators who believe alternative or emerging technologies would be just as effective for reducing impingement and entrainment.

EPA believes that the final rule also provides States with a consistent, well-defined framework for determining appropriate technologies required to reduce adverse environmental impacts associated with CWISs. The two track approach established in the rule provides flexibility for facilities to demonstrate alternative technologies that are as protective of aquatic organisms as the established Track I requirements. In this way, decisions about cost-effectiveness can be made at the facility level according to site-specific conditions. In addition, EPA believes that the final rule retains a high degree

of flexibility for States to consider local conditions in their review and approval of permit requirements and in permit reissuance. All aspects of permitting are subject to review and approval by the permitting authority. Specifically, States are expected to review information provided in permit applications, and make determinations as to the appropriateness of the planned design and construction technologies, and (for Track II) Comprehensive Demonstration Study methodologies and results. State permitting authorities will also verify that facilities meet the appropriate proportional flow requirements. States will have the authority to include additional or alternative requirements in reissued permits to account for site-specific issues. Furthermore, the final rule applies to a specific universe of facilities that meet the established intake flow and cooling water use thresholds. Any new facility that has or requires an NPDES permit but does not meet the applicability thresholds established in the final rule will continue to be subject to permit conditions established by the permit director on a case-by-case basis using best professional judgment. Sections VII.C and VII.F of the preamble to the final rule describe the role of the permitting authority in more detail.

Comment ID 316bNFR.522.006

Subject Matter Code	10.16
Two Track Process	

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Organization PSEG Power LLC

The tiered approach that EPA considered prior to issuing this proposed rule, if properly structured, could offer a reasonable method of reducing administrative burdens while remaining faithful to the statute. Under the tiered approach, a CWIS that is unlikely to result in AEI would not need technology additions or other measures. Simple studies that are not difficult to analyze could be used for these cases. Other sources would perform more detailed analyses of potential impacts, leading, where appropriate, to technology or other measures to reduce or eliminate AEI. Adoption of a viable fast-track option would further reduce the expenditure of administrative resources. UWAG's comments on the proposed rule suggested that EPA include a fast-track option under which companies that wish to receive permits relatively quickly may do, so by agreeing to meet technology or other requirements that are considered exemplary. PSEG urges the Agency to adopt a realistic fast-track option, one that represents a reasonable tradeoff between permitting speed and expense. Such an option could do much to alleviate the resource concerns expressed by the States while, at the same time, allowing rapid but responsible expansion of the nation's energy supply.

EPA Response

See response to comment 316bNFR.509.013 and the preamble of today's rule.

Comment ID 316bNFR.522.007

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

For more complex circumstances, the current approach has worked well for many years. The States and the regulated community understand how to implement it. Perhaps more importantly, the current system has led to remarkably successful conservation measures such as PSEG's Estuary Enhancement Program (the "EEP") at its Salem plant on the Delaware River. The EEP, a huge and ambitious project, is successfully enhancing fish populations by restoring wetlands, installing fish ladders and through other mechanisms. The EEP has accomplished a great deal toward eliminating what the State of New Jersey regarded as a potential for the Salem CWIS to cause adverse environmental impact. The EEP demonstrates that wetlands restoration can be successful on a very large scale and that such projects can help reverse the decline in the nation's valuable wetlands resources. The EEP is a prime example of how creative approaches can reduce the cost of ensuring compliance with Section 316(b) while achieving environmental benefits that are broader, and more long lasting, than a narrow, exclusively technology-based approach.

In this rulemaking, EPA has recognized that conservation measures can provide important environmental benefits in the context of Section 316(b) permitting. During its consideration of options for the proposed rule, the Agency was considering mandating mitigation as part of Best Technology Available ("BTA"). Although this concept was not included in the proposal, the Agency specifically solicited comments on the role of conservation measures in the Section 316(b) program. While pointing out the legal and policy flaws of including mandatory conservation measures as part of BTA, PSEG presented comprehensive comments urging the Agency to retain a role for voluntary conservation measures. We strongly urge EPA to include this voluntary role for conservation measures in the final rule.

The role of conservation measures is inextricably intertwined with issues highlighted by the NODA: the appropriate decision-making framework for implementing Section 316(b), and the interpretation of the statute's direction to the Agency to require "best technology available for minimizing adverse environmental impact." Inappropriate decisions with respect to these issues would jeopardize the Agency's ability to continue encouraging the appropriate role for conservation measures in the Section 316(b) rules for both new and existing facilities.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.522.008

Subject Matter Code	6.1
Current Implementation of Sec. 316(b)	

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Organization PSEG Power LLC

The Focus of Section 316(b) Must First Be on Effects, Second on Methods of Addressing Adverse Effects.

As noted above, the Agency has long implemented the Section 316(b) program in a manner that first identifies potential adverse environmental impacts and then considers options for reducing or eliminating them. Unlike other provisions of the Clean Water Act, Section 316(b) requires a finding of adverse environmental impact before the Agency is authorized to impose requirements for "best technology available." This is a well-settled principle. See, e.g., In re Pub. Serv. Company of NH., Seabrook Station, NPDES Permit Application No. NH0020338, Decision on Remand, Case No. 76-7, EPA Region I (June 10, 1977) (decision of the Administrator) ("Seabrook I") at 10.

Now, for the first time in nearly thirty years, EPA appears to be considering a fundamentally different interpretation. In its NODA, the Agency states that the phrase "best technology available for minimizing adverse environmental impact" could, instead, be interpreted in a way "that focuses on the technology, rather than the impact, in a manner analogous to the technology-based standards applicable to point source dischargers under Clean Water Act sections 301, 304, and 306." 66 Fed Reg. at 28863. If EPA were to adopt this interpretation of Section 316(b), turning the Section 316(b) program into another technology-based program despite statutory language and a long history of implementation to the contrary, the Section 316(b) program would waste vast sums of money and impede the development and expansion of facilities to meet the nation's future energy needs. In addition, the Agency would be very unlikely to sustain that position in litigation, necessitating a second major rulemaking effort.

EPA Response

See response to comment 316bNFR.524.069, 316bNFR.068.007, 316bNFR.068.008 and the preamble of today's rule.

Comment ID 316bNFR.522.009

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

Moreover, this interpretation of Section 316(b)—which would require a specified set of technologies regardless of the potential impact of the CWIS on the water body and ecosystem in which it is to be located--would leave little room in the program for voluntary conservation measures, such as the EEP. Conservation measures, no matter how capable of eliminating or reducing AEI, could not meet the requirement for installation of BTA that would have to be employed under this system. The incentive for undertaking voluntary conservation measures would be eliminated. This is an untenable and unwise position for the Agency to consider.

EPA Response

See response to comment 316bNFR.024.007 and the preamble to the final rule.

Comment ID 316bNFR.522.010

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

"Adverse Environmental Impact," If Defined, Must Refer to Populations or Communities.

In the August 2000 proposal, the Agency decided not to define the term "adverse environmental impact." The preamble, however, identified a number of approaches for defining "AEI" if the Agency were to decide to include a definition in the final rule. The NODA devotes considerable attention to describing new information that has been placed in the docket, and its implications with respect to possible definitions of AEI. 66 Fed. Reg. at 28859-28863.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.522.011

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

PSEG is concerned that the portion of the NODA relating to AEI suggests that the Agency may define this concept in a manner that would inhibit the use of voluntary conservation measures as a means of reducing or eliminating AEI. If AEI is defined in terms of the loss of organisms, without reference to the biological implications of such losses for populations of important species, then conservation measures would be much more difficult to design and implement. The most valuable conservation measures, such as wetlands restoration, are designed to enhance ecosystem productivity on a broad scale. While their substantial benefits are acknowledged and documented through monitoring efforts such as those associated with the EEP, measurement techniques are not capable of guaranteeing that habitat improvements will accomplish direct, one-for-one replacement of individuals lost through CWIS effects. Section 316(b) does not require that CWIS losses be offset on a one-for-one basis, only that adverse environmental impacts be minimized. Conservation measures certainly can meet that objective, and frequently offer a larger and more diverse array of ecosystem benefits, as exemplified by the EEP. In addition to achieving its principal purpose of enhancing fish production, the EEP's restored wetlands provide habitat for a huge variety of plants and animals, including threatened and endangered species They also improve water quality, contribute to flood control and shoreline stabilization, and provide recreational and educational opportunities. These broad and long-lasting benefits demonstrate why voluntary conservation measures play an important role in the Section 316(b) program, as they do in other environmental programs, such as the CWA Section 404 program and decisions under the National Environmental Policy Act, the Coastal Zone Management Act and the Endangered Species Act.

It is well established that the loss of individual organisms does not necessarily jeopardize fish populations and, accordingly, does not necessarily represent adverse environmental impacts. Indeed, it is well-documented that even losses of considerable numbers of individuals may not present long-term adverse impacts. For example, in regulations implementing the Magnuson Stevenson Fisheries Conservation and Management Act, the National Marine Fisheries Service ("NMFS") recognizes that fish populations can withstand fairly high levels of exploitation and yet remain sustainable. It is NMFS's belief that maximum productivity of fish stock can be achieved when the stock is just 40 percent of the stock size that would exist without any mortality (the "pristine level") and that a fish population can sustain itself if the stock is not reduced below 20 percent of the pristine level. See 63 Fed. Reg. 24212,24219 (May 1, 1998). EPA and the courts have long recognized the importance of compensation mechanisms in the context of Section 316(b) as well. See, e.g. Seabrook I at 44. Indeed, if it were not for the effects of compensation, commercial fisheries could not exist.

EPA Response

Please see section VI.L (restoration) of the preamble for today's rule and responses to comments 316bNFR.507.004 and 316bNFR.068.037.

EPA considered the issue of compensation and its relevance to today's rulemaking effort (see section

VI.B.2.c of the preamble). EPA agrees that diminishment of a population's potential compensatory reserve equates to an adverse environmental impact but also notes that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates.

Comment ID 316bNFR.522.012

Subject Matter Code	15.1
Request for Comment: Role of Restoration	

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

Conservation measures can be effective in reducing or eliminating stresses on fish populations in several ways. Fish ladders can restore spawning runs of fish that may be important themselves and may serve as a food source for other species. The EEP's fish ladders are restoring spawning runs for river herring, which—in addition to their own value—serve as a food source for striped bass and weakfish. Properly-designed restored wetlands, such as the EEP, allow the propagation of a variety of fish species by restoring normal daily tidal inundation, achieving geomorphic conditions, and achieving levels of macrophyte and algal production typical of healthy marshes.

EPA Response

See response to comment 316bNFR.024.007.

Comment ID 316bNFR.522.013

Subject Matter Code OPP

General Statement of Opposition

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

The NODA includes suggestions that the Agency may adopt approaches in this and the subsequent rules that are inconsistent with the statutory language, reverse longstanding precedents, and hindering the use of voluntary conservation measures as a means of achieving Section 3 16(b)'s objectives. PSEG urges the Agency not to do so. Instead, the Agency should issue a final rule that offers a permit streamlining option while preserving the best aspects of the current system—its ability to encourage innovative, cost-effective solutions to site-specific problems.

EPA Response

See response to comment no. 316bNFR.069.002 and the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Maureen F. Vaskis & Mark F. Strickland

On Behalf Of:

PSEG Power LLC

Author ID Number:

316bNFR.523

Note

Fully supports the comments made by UWAG (316bNFR.524) and EEI (316bNFR.525). Attachments received with 523 coded as 316bNFR523, beginning with comment number 100 (Appendix A).

Comment ID 316bNFR.523.001

Subject Matter Code EXIST

Existing Facility Rule

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

The reasons for PSEG's interest are twofold, first the rulemaking will affect PSEG's development of new generating stations and second it may affect, indirectly, the acceptance of approaches that have been adopted into NPDES permits for PSEG's existing facilities. While existing facilities are to be addressed in a subsequent ("Phase II") rule, PSEG believes it is important for EPA to adopt appropriate, defensible, and consistent positions with respect to key issues such as: 1) whether more stringent technology requirements should be applied in estuaries and tidal rivers, 2) assessment of approaches for determining "adverse environmental impact" ("AEI"), 3) cost estimates for closed cycle cooling systems, 4) pre-operational biological monitoring and 4) a "fast-track" alternative approach for new facilities.

EPA Response

See the preamble to today's final rule and other comment responses in this response to comment document.

Comment ID 316bNFR.523.002

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

Tidal Rivers and Estuaries

In the NODA, EPA stated that it had further examined the issue of whether estuaries and tidal rivers are more sensitive to entrainment and impingement impact:

In response to comments, EPA further examined this issue and requests comment on the following documents found in #2-013A-O in the Docket. These documents include information on larval densities in selected estuaries and tidal rivers, impingement and entrainment rates for facilities located in these areas, conditional mortality rates of organisms in selected estuary and tidal rivers (requires calculation of larval densities), and discussions of the life history and reproductive strategies of marine and estuarine organisms that are relevant to EPA's consideration of whether these locations may be sensitive to impingement and entrainment impactsassociated with cooling water intake structures. (NODA at p. 28857)

EPA invites comment on the documents, which may support a judgment that the reproductive strategies of tidal river and estuarine species, together with other physical and biological characteristics of those waters, make these ecosystem waters particularly susceptible to cooling water intake structures. (NODA at p. 28857)

PSEG Response:

PSEG does not agree that estuaries and tidal rivers are more vulnerable than other waterbody types to entrainment and impingement impacts. The cited docket items do not in general support the proposition that tidal rivers and estuaries are more susceptible to adverse environmental impacts of entrainment and impingement. Moreover, EPA has failed to cite or discuss other information that supports the proposition that many estuarine-dependent species are highly resilient to entrainment and impingement impacts.

Docket #2-013A, "Vulnerability of Biota of Freshwater (Rivers, Lakes, Reservoirs) versus Marine (Tidal River, Estuary, Ocean) Habitats to Entrainment and Impingement Impacts," is a memo by Dr. William Richkus that discusses biological and physical factors that affect the susceptibility of various fish species and life stages to entrainment and impingement.

Dr. Richkus evaluated various life history characteristics that influence the vulnerability of fish to entrainment and impingement. For adults of small fish species, and for juveniles of all fish species, he argued that species occupying pelagic habitats either as adults or as juveniles are more likely to be impinged than are species occupying demersal habitats, and that such species are more common in marine waters than in freshwaters. These conclusions, as is stated on pages 2 and 3 of the memo, are not supported by any published scientific literature.

There was no literature that provided an overview of the proportion of small freshwater and marine

species that have pelagic versus demersal life styles. (Docket # 2-013A, p. 2)

I could find no literature to document that there are more species with pelagic juvenile stages in marine waters than in freshwaters, although from my limited knowledge of freshwater species, I believe that this is the case. (Docket # 2-013A, p. 2)

For entrainable life stages, Dr. Richkus argued that a higher percentage of marine species than of freshwater species exhibit reproductive characteristics that increase the vulnerability of early life stages to entrainment. This conclusion is supported by a citation to Docket #2-013B, which is discussed below.

Regardless of whether the conclusions stated in Docket #2-013A are correct, information summarized in Tables 11-4 and 11-5 of EPA's Economic and Engineering Analysis of the Proposed 316(b) New Facility Rule shows that some freshwater fish species are entrained or impinged in large numbers. Moreover, Dr. Richkus' analysis relates only to the susceptibility of individual organisms, not to the vulnerability of populations or ecosystems to adverse effects related to entrainment and impingement. According to Docket #2-013B, many marine and estuarine species that are susceptible to entrainment and impingement possess life history characteristics that permit them to sustain high levels of early life stage mortality. Dockets #2-013E, Draft Environmental Impact Statement for State Pollutant Discharge Elimination System for Bowline Point, Indian Point 2 & 3, and Roseton Steam Electric Generating Stations, and #2-018E, Historical Overview of Two Decades of Power Plant Fisheries Impact Assessment Activities in Chesapeake Bay, summarize, respectively, results of long-term studies of impacts of entrainment and impingement on fish populations in the Hudson River and Chesapeake Bay. Other documents discussed in this response, which were not included in the Docket, summarize results of similar studies performed in the Delaware Estuary. No adverse environmental impacts on susceptible fish populations were observed in any of the studies.

Docket #2-013B, "Patterns of Life-History Diversification in North American Fishes: Implications for Population Regulation," discusses reproductive strategies of North American fish species in general, and does not discuss whether species inhabiting one ecosystem type are any more or less resilient to mortality (including intake-related mortality) than are species inhabiting other ecosystem types. This document does, however, note that many species that are commonly entrained and impinged at estuarine cooling water intake structures, including striped bass, bay anchovy, and Atlantic menhaden, follow life history strategies in which natural mortality rates of early life stages are extremely high. For such species, entrainment and impingement counts do not serve as useful indicators of potential adverse environmental impacts because few of the entrained or impinged organisms would survive even in the absence of entrainment and impingement. Moreover, the document states that the life history strategy exemplified by striped bass (termed periodic by the authors) is "predominant among commercial fish stocks worldwide." The fact that such species support intensive exploitation indicates that they are relatively resilient to mortality imposed by fishermen. Because population-level effects of mortality due to entrainment and impingement are similar to effects of fishing mortality (Goodyear 1977, 1988, 1993), these species should also be relatively resilient to mortality caused by cooling water intake structures.

Docket #2-013C, "Renewal Application for Salem Generating Station Permit No. NJ00005622 ("1999 Salem Application"), Appendix F, Attachments 1 & 2, Baywide and In Plant Sampling Programs and

Sampling Methods; and Model Methodologies and Common Input Parameters," and Docket #2-013D, "Renewal Application for Salem Generating Station Permit No. NJ00005622, Appendix L, Data Sets," discuss methods and data sets used in PSEG's 1999 Renewal Application. These documents explain the methods used in PSEG's analyses and provide intermediate calculations (e.g., loss estimates and CMRs). Other key components of PSEG's analysis, in particular the review of information regarding compensation in fish populations (Appendix I), the analysis of trends in abundance of major Delaware Estuary fish species (Appendix J), the 316(b) demonstration (Appendix F), and the cumulative effects assessment (Appendix H) have not been included in the docket, although PSEG provided EPA with these documents. These uncited documents (attached to these comments) show that, in spite of the calculated loss estimates and CMRs, the major fish populations that utilize the estuary are thriving and show no evidence of adverse impacts due to Salem.

Docket #2-013E, the Draft Environmental Impact Statement ("DEIS") prepared by the Hudson River utility companies to support renewal of SPDES permits for cooling water intake structures located on the Hudson River estuary, discusses impacts of entrainment and impingement on striped bass and other major species that utilize the Hudson River Estuary. Like the 1999 Renewal Application for Salem, the Hudson River DEIS demonstrates that the major Hudson River fish populations are thriving and show no evidence of adverse impacts due to cooling water withdrawals.

Docket #2-013F, a letter from the NMFS Northeast Regional Administrator to Ms. Debra Hammond of NJDEP in connection with Salem's NJPDES permit renewal, provides no new information concerning impacts of cooling water withdrawals on fish populations. It simply states NMFS' concerns regarding the magnitude of entrainment and impingement losses, notes that several managed species may utilize the habitat type from which the Salem Generating Station withdraws water, and requests that NJDEP prepare an Essential Fish Habitat (EFH) assessment to determine the effects of cooling water withdrawals on that habitat.

PSEG believes that the requested EFH assessments are largely duplicative of information already provided in the renewal application. Appendix H of PSEG's renewal application contains a comprehensive and thorough assessment regarding the effects of Salem's operation on key fish populations inhabiting the Delaware Estuary. The Representative Important Species ("RIS") evaluated in Appendix H were specifically selected, with the concurrence of a Technical Advisory Group ("TAG") that included a NMFS representative, because they were believed to be particularly vulnerable to entrainment and impingement. Information provided in Appendix H demonstrates that Salem has had no adverse impacts on any of these species. If the most vulnerable species are not being affected by Salem's operations, then presumably less vulnerable species occupying the same habitat should be similarly unaffected.

Dockets #2-013G, H, L, and O simply document estimates of entrainment losses, CMRs, and analyses relating ambient larval densities to entrainment densities. They draw no conclusions concerning the susceptibility of tidal rivers and estuaries relative to other types of ecosystems.

Dockets #2-013I and N provide basic information concerning the life history and geographic distribution of marine and estuarine fish species found in the New York Bight and the Gulf of Maine. No information regarding susceptibility to cooling water intake structures is provided.

Docket #2-013J is a catalog of assessment methods compiled by the Electric Power Research Institute; it contains no data or analyses relating to the susceptibility of different ecosystem types to cooling water withdrawals.

Docket #2-013K, a report on potential impacts of cooling water withdrawals on estuarine and coastal species, does conclude that those impacts are potentially significant. However, this report was published nearly 30 years ago, and its conclusions were based primarily on the locations and cooling water withdrawal rates of existing and proposed electric generating facilities. It does not reflect that data regarding actual impacts of cooling water withdrawals that has accumulated since its publication in 1973. Consequently, the report should be considered irrelevant to EPA's current rulemaking on 316(b).

Docket #2-013M, Testimony of Dr. Ruth Patrick at Public Hearings on the Draft NJPDES Permit for Salem, states that estuaries are ecologically important and that they provide nursery habitat for many important marine and estuarine species. However, Dr. Patrick did not discuss the vulnerability of estuaries to impacts from entrainment and impingement Dr. Patrick's testimony focused instead on the ecological benefits resulting from PSEG's salt marsh restoration efforts. However, colleagues of Dr. Patrick at the Academy of Natural Sciences did opine on the effects of Salem on the RJS and concluded that the Station was not causing an adverse effect. See Docket #2-025C, Testimony of Dr. Sage.

For estuarine-dependent species such as weakfish, striped bass, and bay anchovy, for which early life stage mortality rates are very high, mortality that affects only eggs and larvae can easily be offset by density-dependent increases in the survival rates of the remaining fish. Depending on the type of relationship between spawning stock size and subsequent production of age-1 recruits, additional mortality due to entrainment can actually increase the number of fish surviving to age 1. According to data provided in the most recent ASMFC stock assessment for weakfish (NMFS 2000), the current level of spawning stock biomass (SSB) for this species is twice as large as the level that would provide the maximum recruitment at age 1. At the current high levels of weakflsh SSB, recruitment has reached a maximum and is currently stable; recruitment may actually decline if SSB grows any larger. This occurs because of food and habitat limitation within estuaries and tidal rivers, which limits the number of fish that can be produced.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Therefore, the discussion regarding whether or not estuarine and tidal river environments are more sensitive to CWIS impacts or whether these environments are richer in terms of abundance and diversity of aquatic life is no longer relevant to the main regulatory framework in the rule. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones.

See responses to comments 316bNFR.206.103, 316bNFR.039.010, 316bNFR.025.003.

Comment ID 316bNFR.523.003

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

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Additional Impingement, Entrainment, and Mortality Data

In the NODA, EPA requested comments on a variety of documents related to entrainment losses, CMRs, and population modeling approaches for assessing adverse impacts of cooling water withdrawals:

While EPA's record at proposal demonstrates that cooling water intake structures do not kill, impinge, or entrain just one fish, or even a few aquatic organisms, today's Notice invites comment on additional information that provides further examples of cooling water intake structures that kill or injure large numbers of aquatic organisms. For example, in #2-013 in the Docket, EPA provides information on aquatic organism conditional mortality rates for the Hudson and Delaware rivers, which demonstrate the degree of mortality due to cooling water intake structures. If EPA decides to include a definition of AEI in the final rule, it is considering whether to define adverse environmental impact using a population endpoint or an alternative that relies upon counts of impinged and entrained organisms.

Further, EPA is considering documents that discuss potential consequences associated with the loss of large numbers of aquatic organisms. These include impacts on the stocks of various species, including any loss of compensatory reserve due to the deaths of these organisms, and the overall health of ecosystems.

EPA also invites commentors to submit for consideration additional studies that document either significant impacts or lack of significant impacts from cooling water intake structures. (NODA at p. 28859)

PSEG Response:

PSEG endorses the concept of defining "adverse environmental impact" at a population level. However, the documents cited in Docket #2-018 provides an incomplete and unbalanced characterization of impacts of cooling water intake structures on fish populations. First, they focus on a few, large facilities that have been studied for many years. Entrainment and impingement losses at these facilities are not representative of the magnitude of losses or the potential effects that would be expected at other facilities. More important, conditional mortality rates are short-term measures of impacts on populations. They measure the mortality imposed on a population by entrainment or impingement, but do not measure the response of the population to that additional mortality. This critical limitation is discussed in Docket #2-018B, "Primer on Entrainment and Impingement Conditional Mortality Rate":

most importantly [emphasis included in original document], the significance of an entrainment/impingement conditional mortality rate to status of future populations is completely dependent on the magnitude of compensation (i.e., density dependent mortality) occurring; if a high degree of compensation exists, large conditional mortality rates might have little effect on yearclass

size; if little compensation exists, then the conditional mortality rate would closely represent the extent to which the size of a yearclass was reduced. (Docket #2-018B at p. 2)

Responses of populations to entrainment or impingement mortality can be predicted using models that incorporate compensation, and can be measured through long-term monitoring. Docket #2-013E contains, in addition to conditional mortality rates, population modeling results and long-term trends analyses demonstrating the fact that striped bass and other fish populations in the Hudson River have not declined in abundance or shown any other signs of adverse impacts related to cooling water intake structures. Similar analyses are available for the Delaware Estuary, and were submitted to NJDEP as part of the 1999 Renewal Application for Salem Generating Station. (See attached Appendices F and H). These analyses were available to EPA but were not included in the Docket.

The documents cited by EPA in Docket #2-018 provide an incomplete and unbalanced characterization of the potential consequences of entrainment and impingement losses.

Docket #2-018A, "Surplus Production, Compensation and Impact Assessments of Power Plants," discusses the concepts of "surplus production" and "compensation" as used both in fisheries science and power plant impact assessment. It argues that these concepts are oversimplifications that ignore environmental variability and interactions between species. The author acknowledges, however, that the methods he is criticizing are still the only available approaches for providing scientific advice to fisheries managers. A huge body of scientific literature and fisheries management experience, including documents included in the docket (e.g., Dockets #2-020C, and 2-024B, and 2-024J), demonstrates that the methods discussed in Docket #2-018A provide important information concerning the responses of fish populations to additional mortality and can be used to establish management policies that protect populations from harmful effects of overexploitation.

As noted above, Docket #2-018B discusses the strengths and weaknesses of the CMR as a measure of impacts due to entrainment and impingement. The document does not discuss the "potential consequences" associated with entrainment or impingement losses.

Docket #2-018C, "Impingement Values for Plants with Flows Less Than 100 MGD," is a set of tables listing estimated total numbers of fish impinged at various estuarine and Great Lakes power plants, together with the design cooling water flow rate of each plant. It's not clear how EPA expects to use these values, since no information on the sizes of the populations from which the fish were removed is provided. Without such information, the annual loss totals themselves reveal nothing about the magnitudes of impacts on populations.

Docket #2-018D, "Transmittal of Impingement and Entrainment Study for Charles Point Resource Recovery Facility," provides entrainment and impingement data for a small generating facility on the Hudson River. The study shows that entrainment patterns (seasonality, relative abundance of various life stages entrained) at the Charles Point facility are similar to patterns observed at the nearby Indian Point Nuclear Generating Station. Entrainment and impingement densities (numbers/m3) are provided, but are not scaled up to annual losses. Again, it is not clear how EPA intends to use these data to address the issue of adverse impacts.

Docket #2-018E, "Historical Overview of Two Decades of Power P1ant fisheries Impact

Assessment Activities in Chesapeake Bay," discusses two decades of studies of impacts of entrainment and impingement on Chesapeake Bay fish populations. The focus of the paper is on the methods used, not on the results. However, the paper clearly states that cooling water withdrawals are compatible with other uses of the bay's aquatic resources:

The absence of power plant water withdrawal impact issues in Maryland for more than a decade, concurrent with the intense state/federal effort to restore Chesapeake Bay and its resources, is evidence that the approaches developed and applied by PPRP have satisfied the state's needs and requirements. However, a critical point to be made regarding the regulation of power plants in Maryland is that the regulatory procedures successfully employed to protect the living resources of Maryland's Chesapeake Bay and to allow for the generation of electricity essential to the state's citizens and industry clearly allows for cooling water withdrawal as a valid use of the state's water resources, so long as the consequences of this use is balanced against other related sources of impacts and the state's overall environmental and social objectives. (Docket #2-018E, at p. S293).

Docket #2-013C is an incomplete citation of scientific analyses included in PSEG's 1999 Renewal Application for Salem Generating Station. It includes methods and results of entrainment/impingement loss and conditional mortality rate calculations, but does not include results of trends analyses, stock jeopardy analyses, and comprehensive stock assessments, which are independent lines of evidence that address the population-level consequences of the losses and conditional mortality rates. These analyses are provided in Appendices F, J, and H to the Application, attached to these comments. Taken together, the information provided in these documents and in Dockets #2-013D and #2-018E clearly shows that, in three estuarine ecosystems that have been studied intensively for over 20 years, the operation of power plants with once-through cooling systems has caused no discernible adverse effects on any fish populations.

Appendix A to these comments reviews entrainment data presented in Docket #2-013D (Salem Permit Renewal Application) and Docket #2-013E (Hudson River Draft Environmental Impact Statement) to demonstrate that loss estimates and CMRs are inadequate measures of impacts of entrainment on fish populations. Appendix A shows, first, that entrainment losses are determined both by the rate of mortality imposed on a vulnerable fish population (as measured by the CMR) and by the size of that population (Appendix A, Figures 2-4). Loss estimates for extremely abundant species (e.g., bay anchovy) will always be higher than loss estimates for a less abundant species, even though the mortality imposed on the two populations (as measured by the CMR) are the same. Moreover, when populations grow, as the Hudson River striped bass and Delaware Bay weakfish populations have grown in recent years, losses at cooling water intake structures can increase, even when there is no increase in station-related mortality rates. Appendix A (Figures 5-6) also shows that, when density-dependent mortality is occurring in early life stages of fish populations, CMR values can greatly overestimate the actual reduction in population abundance caused by entrainment. As is shown in Figures 7-13 of Appendix A, data for the Hudson River striped bass population demonstrate the occurrence of density-dependent mortality in early life stages, and the Atlantic coastal weakfish populations of striped bass and weakfish demonstrate the occurrence of density-dependent mortality in these fish stocks.

Therefore, estimates of entrainment CMR for these populations significantly overestimate the actual population-level impacts of entrainment.

EPA Response

The commenter objects that impingement and entrainment losses at a few, large facilities that have been studied for many years should not be considered representative of the magnitude of impacts that may occur at other, smaller facilities. EPA notes that it has not presented losses at large facilities as representative of smaller facilities. In fact, in Chapter 11 of the New Sources Engineering and Economic Analysis, EPA presents data on impingement and entrainment rates at nearly 100 facilities representing a range of intake design, capacity, and location.

EPA agrees with the commenter that the significance of impingement or entrainment conditional mortality rates (CMRs) for the future status of the adult population will depend in part on any potential density-dependent compensation that may occur in response to impingement and entrainment mortality. However, EPA notes that the timing, functional form, and magnitude of any potential compensatory response is unknown for most populations subject to intake-related mortality. EPA believes that the occurrence of compensation should be demonstrated unambiguously and quantified with explicit consideration of uncertainties in the estimates. EPA points out that this typically requires many years of extensive biological monitoring at a cost of millions of dollars, an effort that would clearly cause unreasonable delays in the permitting of new facilities. To avoid such delays, while also protecting aquatic resources from unacceptable or unanticipated risks, EPA's New Facility Rule requires new facilities to adopt measures to minimize impingement and entrainment to the extent that is economically practical and achievable with available technologies.

EPA has several additional comments in response to the commenter's other suggestions about population-level assessments of § 316(b) impacts. First, regarding the concept of "surplus production," EPA concurs with the author of the article cited by the commenter that the concept of surplus production is an inadequate basis for management because it fails to consider the ecosystem context of fish losses, whether the losses occur from fishing or other anthropogenic stressors such as cooling water intake structures. Losses that occur to one population have important consequences for other species, and a failure to take this into account can result in an underestimation of risks. For example, in the case of Chesapeake Bay discussed by the commenter, a food web model estimated that losses of prey species at cooling water intakes can result in significant impacts to predator populations, a factor not considered in Maryland's evaluations of impacts of cooling water intakes on Chesapeake Bay fish populations. Maryland's permitting actions are based on single species population models that fail to consider the interactions that occur among multiple species within the ecosystem as a whole.

Finally, EPA notes that the difficulties identified by the commenter that are associated with evaluating the population-level significance of CMRs apply to other population-based assessments as well. All else being equal, the significance of impingement and entrainment losses for the population will depend on the size of the affected population and many other factors that are difficult to determine. This is one of the major advantages of the proposed technology-based rule, which requires reduction in impingement and entrainment to the extent that is economically practical and achievable with available technologies, irrespective of predictions about population-level or other indirect consequences of intake-related losses. Please see responses to comments 316bNFR.507.004 (AEI interpretation/population-

level assessments) 316bNFR.068.015 (compensation), and section VI.B.2 of the preamble for additional discussion of these issues.

Comment ID 316bNFR.523.004

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

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Population modeling

In the NODA, EPA requested comments on a list of references related to the use of population modeling in environmental impact assessment (Docket #2-019A). EPA also requested comments on a review of PSEG's assessment of the impacts of Salem on the Delaware Estuary, prepared by ESSA Technologies, Ltd (Docket #2-019B).

PSEG Response:

The list of references (Docket #2-019A) is valuable but not complete. The Hudson River DEIS (Docket #2-013E) contains a review of the concept of compensation and an application of state-of-the-art compensation modeling techniques to the Hudson River striped bass population. Docket #2-013C, "Renewal Application for Salem Generating Station Permit No. NJ00005622, Appendix F, Attachments 1 & 2, Baywide and In Plant Sampling Programs and Sampling Methods; and Model Methodologies and Common Input Parameters," includes a discussion of methods used to model compensation in Delaware Estuary fish population; Appendix F (attached) to the 1999 Renewal Application for Salem Generating Station applies those methods to various Delaware Estuary fish populations. Appendix I (attached) to the 1999 Renewal Application provides a review of current scientific understanding of compensatory processes in fish populations.

The following additional books and peer-reviewed articles, most of which were referenced in PSEG's 1999 Application for Salem which had been provided to EPA, are also relevant and should be considered by EPA:

Cowan, J. H. Jr., and K. A. Rose. "Individual-Based Model of Young-of-the-Year Striped Bass Population Dynamics. II. Factors Affecting Recruitment in the Potomac River, Maryland." Transactions of the American Fisheries Society 122 : 439-58. 1993.

DeAngelis, D. L. K. A. Rose L. Crowder E. Marschall and D. Lika. "Fish Cohort Dynamics: Application of Complementary Modeling Approaches." American Naturalist 68: 273-92. 1993.

DeAngelis, D. L. L. L. Godbout and B. J. Shuter. "An Individual-Based Approach to'Predicting Density-Dependent Compensation in Smallmouth Bass Populations." Ecological Modelling 57: 91-115. 1991.

Goodyear, C. P. Spawning stock biomass per recruit in fisheries management: foundation and current use. In S. J. Smith, J. J. Hunt, and D. Rivard (eds.), Risk evaluation and biological reference points for fisheries management. Canadian Special Publications in Fisheries and Aquatic Science. 120: 67-81. 1993.

Jager, H. I. D. L. DeAngelis M. J. Sale W. Van Winkle D. D. Schmoyer M. J. Sabo D. J. Orth and

J. A. Lukas. “An Individual-Based Model for Smallmouth Bass Reproduction and Young-of-the-Year Dynamics in Streams.” Rivers 4: 91-1 13. 1993.

Madenjian, C. P. and S. R. Carpenter. “Individual-Based Model for Growth of Young-of-the-Year Walleye: a Piece of the Recruitment Puzzle.” Ecological Applications 1: 268-78. 1991.

Rice, J. A. T. J. Miller K. A. Rose L. B. Crowder E. A. Marschall A. S. Trebitz and D. L. DeAngelis. “Growth Rate Variation and Larval Survival: Inferences from an Individual-Based Size-Dependent Predation Model.” Canadian Journal of Fisheries andAquatic Sciences 50: 133-42. 1993. ,

Rose, K. A. J. H. Cowan E. D. Houde and C. C. Coutant. “Individual-Based Modeling of Environmental Quality Effects on Early Life Stages of Fish: a Case Study Using Striped Bass.” American Fisheries Society Symposium Volume 14: 125-45. 1993.

Rose, K. A. S. W. Christensen and D. L. DeAngelis. “Individual-Based Modeling of Populations With High Mortality: A New Method for Following a Fixed Number of Model Individuals.” Ecological Modelling 68: 273-92. 1993.

Rose, K. P., and J. H. Cowan Jr. “Individual-Based Model of Young-of-the-Year Striped Bass Population Dynamics. I. Model Description and Baseline Simulations.” Transactions of the American Fisheries Society 122, no. 3: 415-38. 1993.

PSEG has reviewed Docket #2-019B, “Review of Portions of Salem Permit — Final Report for New Jersey Department of Environmental Protection,” (the ESSA Report), and has provided detailed comments to the NJDEP. PSEG provided EPA with a copy of its response to the ESSA Report in April 2001 and questions why EPA did not include PSEG’s Response to the ESSA Report in the NODA. It should be noted that only a small portion (Section 5.5) of ESSA’s review dealt with population modeling. As discussed in PSEG’s response, many of ESSA’s comments were inaccurate and overstate the degree of uncertainty associated with PSEG’s models, and model results.

In addition to reviewing PSEG’s data, methods, and results, ESSA proposed its own measure of adverse environmental impact, termed “biomass lost to the ecosystem” (“BLE”). As defined by ESSA, BLE has two component measures: (1) production foregone (i.e., incremental growth lost to predators due to failure of impinged and entrained organisms to grow, also referred. to as natural mortality foregone), and (2) the biomass of organisms entrained and impinged at the plant.

As detailed in PSEG’s response to the ESSA report, the BLE model is based on a grossly over-simplified conceptual model of ecological processes that ignores compensatory processes that occur in all aquatic ecosystems. It assumes that not only the entrained or impinged fish themselves, but also all of the future growth of those fish are permanently removed from ecosystems. However, in reality, prey that would in the future have been consumed by the entrained and impinged fish are still available for consumption by other fish, and predators that would have consumed the entrained and impinged fish can still find alternate prey. These compensatory processes can be expected to lead to increases in the production of the surviving fish that partly or largely offset the lost production estimated using the BLE model. Because it ignores these processes, ESSA’s BLE model produces estimates of loss

biomass that are biased high and are not credible estimates of the actual production foregone due to entrainment and impingement.

EPA Response

EPA has noted the list of references provided by the commenter, most of which discuss individual-based models. Individual-based models track the daily growth, reproduction, and survival of each individual in a population. Such models can make more precise predictions than other types of population models, but data needs are also substantially greater. Model calibration requires repeated measurements of multiple attributes (e.g., length, weight, location) of the same individual over time for all individuals in a population. Such data are difficult and costly to obtain. As a result, it is often necessary to base processes operating at the individual level on population- or species-level data, which can misrepresent the true variation among individuals and produce unreliable predictions. For these reasons, EPA believes that the individual-based approach has limited applicability in the assessment of intake-structure impacts on aquatic organisms.

The commenter also discusses an evaluation by ESSA Technologies Ltd. PSEG's 1999 permit renewal application for the Salem facility in the Delaware Estuary. In particular, PSEG objects that an ecosystem model developed by ESSA to estimate ecosystem production foregone as a result of impingement and entrainment at Salem did not consider potential compensatory processes. EPA believes that a discussion of ESSA's review of the Salem application is beyond the scope of this rulemaking. However, EPA wishes to reiterate its concerns about the limitations involved in modeling potential compensatory processes in response to power-plant mortality. While EPA acknowledges that some aquatic populations show the potential for compensation under some conditions, there is limited information available to assess potential compensation in most populations subject to impingement and entrainment. EPA believes that this uncertainty is a major concern in a regulatory context, particularly in light of the increased risks of population decline and loss of resilience that can occur in the presence of multiple stressors, background environmental variation, and other factors discussed elsewhere in EPA's responses to comments about compensation. Therefore, EPA disagrees with the commenter that compensation must be included in models of biomass lost to the ecosystem as a result of intake losses. Please see response to comment 316bNFR.068.015 and section VI.B.2.c of the preamble for additional discussion of compensation.

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Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

Compensation

In the NODA, EPA requested comments on a memorandum prepared by Dr. Douglas Vaughan of the National Marine Fisheries Service:

In particular, EPA is seeking comment on a memorandum titled, “Compensation” in #2-020C in the Docket. This document states that the use of compensation factors is typically limited to those cases where fishery managers have extensive data on a fish population and that specific, numerical compensation values generally are not used in the absence of a robust data sets with a minimum of 15-20 years of data suggested. Moreover, fish stocks for which these robust data sets exist are generally the highly exploited commercial and recreational stocks and it is unlikely the data exists for the non-harvested species. This memorandum also notes that in the absence of sufficient data, various proxies are typically used in order to side-step the need for quantitatively determining compensation. (NODA at p. 28860)

EPA also requested comments on several related documents (Dockets #2-020A, 2-020B, and 2-020D).

PSEG Response:

Docket #2-020C, a memo from Dr. Douglas Vaughan of NMFS to EPA, accurately characterizes the use of quantitative estimates of compensation by fisheries managers. In the absence of sufficient data, agencies often use the Spawner per Recruit (SPR) approach to indirectly assess the impacts of fishing On the compensatory reserves of exploited populations. Dockets #2-024B, "An Evaluation of the Use of SPR Levels as the Basis for Overfishing Definitions in the Gulf of Mexico Finfish Fishery Management Plans,” 2-024J, “Scientific Review of Definitions of Overfishing in US Fishery Management Plans,” and 2-024K, “Scientific Review of Definitions of Overfishing in US Fishery Management Plans — Supplemental Report,” discuss applications of the SPR approach to marine fish populations. Several papers documenting the scientific rationale for the SPR approach are included in Docket # 2-019A. As clearly demonstrated in these documents, compensation is considered (although indirectly) in the management of more than 100 marine and estuarine fish populations. As noted by Dr. Vaughan, when sufficient data are available, compensation may be quantified using spawner-recruit (S-R) models. The Atlantic States Marine Fisheries Commission uses S-R models in the management of Atlantic striped bass (ASMFC 2000) and weakfish (NMFS 2000) populations.

The other three Docket items cited by EPA are irrelevant to the issue of whether compensation should be considered in 316(b) determinations. Docket #2-020A, “Our Living Oceans: Report on the Status of U.S. Living Marine Resources,” provides an overview of the status of exploited marine fish populations; it does not include a detailed discussion of modeling methods. Docket # 2-020B, “Science and the Law: Confluence and Conflict on the Hudson River,” discusses compensation, but was published 20 years ago and does not reflect the current state-of-the-science. Docket # 2-020D

describes EPA's agency-level guidelines for ecological risk assessment. The guidelines describe the process EPA should follow in designing and implementing ecological risk assessments, but does not recommend particular types of data or modeling approaches.

As noted above, Appendix A to these comments demonstrates that compensation is occurring in two fish species (striped bass and weakfish) that are vulnerable to entrainment and impingement, and illustrates the use of spawner-recruit models to quantify station-related impacts on fish populations. As discussed in Appendix A, the models used by the ASMFC to manage both of these species are substantially less conservative (i.e., that is the ASMFC models would predict a smaller reduction in abundance and under some conditions an increase in abundance for any given rate of additional early life stage mortality) than the model used in the Attachment.

PSEG believes that, to be considered "adverse," an environmental impact should be substantial and should noticeably affect the abundance or other important characteristics of a population. As stated in the Magnuson-Stevens Fish Conservation and Management Act, a mortality that reduces the abundance of a species to a level that "creates an unacceptable risk to the populations ability to sustain itself or to support reasonably anticipated commercial or recreational harvests," is certainly substantial and adverse. PSEG further believes that the standard assessment methods discussed in the Magnuson-Stevens Act and in technical guidance issued by NMFS are applicable to entrainment and impingement impact assessments and provide a rational basis for AEI determinations and cost-benefits analyses performed under 316(b).

EPA Response

Please see responses to comments 316bNFR.068.015 (compensation), 316bNFR.068.014 (spawner recruit proxies), and 316bNFR.068.037 (MSY).

Comment ID 316bNFR.523.006

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Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

Additional Information Supporting That Impingement and Entrainment May Be a Non-Trivial Stress on a Waterbody.

In the NODA, the EPA stated that it is considering additional information that suggests that impingement and entrainment, in combination with other factors, may be a non-trivial stress on a waterbody:

While recognizing that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, the Agency has identified methods for evaluating more generally the stresses on aquatic, communities from human-induced perturbations other than fishing. Of particular importance is the recognition that stressors cause or contribute to the loss of aquatic organisms and habitat may incrementally impact the viability of aquatic resources. EPA is examining whether waters meet their designated uses, whether fisheries are in stress, and whether waters would have higher water quality or better support their designated uses if EPA established additional requirements for new cooling water intake structures. EPA is considering use of this type of information as one approach for evaluating adverse environmental impact and requests comment on this approach.

In this section, EPA invited comments on a set of documents described as "adverse environmental impact determinations made in connection with State and Federal NPDES Permit decisions." (NODA at page 28862).

PSEG Response:

PSEG notes that the vast majority of the documents that EPA references in Section ll.E, "Additional Data and Information Concerning Impingement and Entrainment Approach and the Population Approach and Biological Assessment Approach to Defining Adverse Environmental Impact," are documents that have been available to EPA prior to its issuance of the Draft Regulations for new sources.

Subsection 4 includes numerous documents that are part of the administrative record for Salem Generating Station's 1994 NJPDES permit and a single document from the administrative record for the 2000 draft NJPDES permit as well as other documents for permitting decisions from the 1980s. With the exception of Docket #2-013F, these documents have been available to the Agency for substantial periods of time.

PSEG, nonetheless, applauds EPA's efforts to review and consider documents that are clearly instructive on the Agency's long-standing interpretation and application of Section 316(b). The permitting decisions cited address questions regarding the existence of adverse environmental impacts related to entrainment and impingement losses. In all instances agencies and the permittees resolved these issues without imposing draconian technological measures. Instead, the parties considered other

measures that would enhance the aquatic ecosystems and/or populations that were affected by entrainment and impingement losses and what measures should be employed to address those losses. It is also important to note at the outset that, with the possible exception of Docket #2-025H, all documents relate to existing facilities.

To provide meaningful comments on the documents that the Agency has identified, the documents must be placed in context. The Salem-related documents are components of a substantial administrative record developed over a number of years beginning with the Draft NJPDES Permit issued on October 3, 1990, which proposed to require that Salem be retrofitted with closed cycle cooling to address findings that the entrainment and impingement losses from Salem had the potential to cause long-term declines in the abundances of certain of the RIS studied in PSEG's 1984 Section 316(b) Demonstration. Since there was limited post-operational data available at the time PSEG filed the 1984 Demonstration, the analysis was predictive. The Demonstration included estimates of CMRs and other measures of impact derived from models such as the empirical transport model ("ETM"), the production foregone model ("PFM") and the equivalent adult model ("EAM"). Trends analyses and stock assessments such as those used in PSEG's 1999 Renewal Application were not included in the 1984 Demonstration because the data needed to implement these retrospective approaches did not yet exist.

During the comment period following the issuance of the 1990 Draft NJPDES Permit, a number of parties, including the permittee and EPA Headquarters, provided substantial new information to the NJDEP. PSEG included updated CMR estimates based on new data and information collected during the period of the Station's operations as well as data on the status of the populations at issue. Comments from EPA Headquarters, contained in a letter from Cynthia Dougherty to John Fields, dated January 14, 1991, stated that the summary of findings appeared to be well documented and "...should serve as a valid starting point for negotiations or adjudication which may occur." Attached to this letter were several USEPA Office of General Counsel Opinions and other guidance as well as decisions and determinations relating to the application of Section 316(b) in other permitting decisions. These included the John Sevier and Crystal River permit decisions, which were cited in this NODA. In its specific comments on Section 316(b), EPA Headquarters noted that these decisions were subject to economic considerations (the "wholly disproportionate test") and that there were no published EPA guidelines relating to what constituted wholly disproportionate. In the John Sevier and Crystal River decisions, EPA Region IV determined that the entrainment and impingement losses associated with these power plants were of concern. However, Region IV also determined that closed cycle cooling could not be required because the cost of retrofitting these facilities would have been wholly disproportionate to the benefits to be achieved. Based on the administrative record on the 1990 Salem Draft Permit, including EPA's comments, the NJDEP and PSEG determined that pursuing settlement was the appropriate means of resolving differences between the parties.

Having provided this context for the Salem-related documents, it is important to note that these documents do not support the proposition that entrainment and impingement losses cause long-term, population level declines that must be reduced, regardless of the costs associated, to ensure the protection of aquatic populations.

Docket #2-025C is the transcript ("Transcript") from the second public hearing held in September 1993 relating to the 1993 revised Draft NJPDES Permit for Salem. At this hearing, comments were

received on a wide variety of issues raised by the draft permit. The testimony with respect to whether the entrainment and impingement losses at Salem were causing an adverse environmental impact, not surprisingly, varied considerably. However, a number of biologists, including those working with PSEG and a number of Scientists from academia, clearly supported the notion that the numeric entrainment and impingement losses in and of themselves did not form an adequate basis for determining "best technology available to minimize adverse environmental impact."

Gerald Lauer, Ph.D., an aquatic ecologist who had been involved in assessing power plant impacts since before the passage of the Clean Water Act in 1972, had worked with PSEG since the early 1980s in evaluating the effects of the Station's cooling water system on the Delaware River. In connection with the 1993 public hearing, Dr. Lauer evaluated the entrainment and impingement losses at the Station as well as the status, life histories, reproductive strategies, and compensatory mechanisms of the relevant populations. He concluded that the losses were not having an adverse environmental impact. Dr. Lauer also noted that the NJDEP's findings concerning the potential for long term adverse effects were based solely on mathematical model results. In contrast, trends data collected by independent regulatory agencies indicate that the populations of young fish (i.e., the life stage that would be most vulnerable to the Station's operations) were stable or had increased over the operating life of the Station. Dr. Lauer concluded that the empirical data on fish abundance in the Estuary was a better means of assessing the health of these populations than the model-generated CMRs. (Transcript at pages 35-45.)

On behalf of PSEG, William Gordon, the former Director of the National Marine Fisheries Service and former Director of the New Jersey Sea Grant College Program, also reviewed the data and information Dr. Lauer relied upon in reaching his conclusions. Based on that review, Mr. Gordon testified that "... the losses of small organisms at Salem have not adversely affected the fish stocks of the Delaware Bay or the coastal Atlantic." He further testified that while, "the numbers lost to impingement and entrainment may seem large... in terms of the total population, they represent a very small fraction of those life states of the species susceptible to the plant operation." Mr. Gordon noted that some entrained or impinged organisms survive and even those that do not survive are returned to the ecosystem and remain in the food web of the Estuary. Mr. Gordon, based on his years of experience in assessing the health of fish populations stated that, "losses cause an adverse impact when they jeopardize the long-term capacity of populations to produce a sustainable yield on a continuing basis." Mr. Gordon then explained that although the losses seemed large they were not having a demonstrable impact on the long-term capacity of the populations to produce sustainable yields on a continuing basis. Mr. Gordon, using the reproductive strategy of whales and weakfish as examples, explained that some aquatic organisms (e.g., whales) have few offspring and invest considerable time and effort into rearing their young, which in turn have a high likelihood of surviving to adulthood. In contrast, female weakfish produce from 500,000 to 1.5 million eggs on an annual basis and invest no time for effort in their rearing; most of these offspring survive only for very short times (a few hours to a few days), which enhances the likelihood of survival for the remaining of spring. Therefore, the losses of early life stage organisms with reproductive strategies such as weakfish are not likely to cause an adverse environmental impact and do not in the case of Salem. (Transcript at pages 48 through 60).

A number of scientists who were not working with PSEG provided further support for the positions espoused by Dr. Lauer and Mr. Gordon relative to the effects of entrainment and impingement losses.

These include: John Kraeuter, Ph.D., Associate Director of the Haskin Shellfish Lab, Institute of Marine and Coastal Sciences at Rutgers University; and Louis Sage, Ph.D. Vice - President of the Academy of Natural Sciences in Philadelphia and Director of its Division of Environmental Research.

Dr. Kraeuter's statement was based on his review of PSEG's 1984 Demonstration, the NJDEP's consultant's reports reviewing the Demonstration and PSEG's 1991 comments on the 1990 Draft NJPDES Permit. Dr. Kraeuter testified that after years of study, the debate over the effects of Salem centered on the number of fish being entrained and impinged rather. than on the more important question of whether the number of fish lost is ecologically significant. Dr. Kraeuter indicated that the arguments put forward to support the claim that the losses were significant were based on models and fairly arcane scientific arguments that may or may not have reliably assessed the effects of entrainment and impingement on the dynamicsof fish populations in question. (Transcript at pages 191-195).

Dr. Sage had spent almost thirty years studying the ecosystems of the Delaware and Chesapeake Bays. Dr. Sage reviewed the estimates of entrainment and impingement mortalities PSEG presented in its permit application and, based on information on the Delaware and experience at other plants, Dr. Sage testified that the Philadelphia Academy of Science believed that the losses "[had] not and will not lead to significant effects on the fish populations of the regions due to the size of the local populations and the high rate of tidal exchange in the Bay". Dr. Sage went on to note that "mechanisms within the populations can accommodate some levels of mortality in juvenile fish that do not significantly diminish population size." Dr. Sage also noted the dramatic return of the striped bass population in the Delaware Estuary, despite years of power plant operation. (Transcript at 315 through 320)

The statements of these highly experienced and reputable scientists clearly do not support the notion that entrainment and impingement losses are non-trivial sources of stress to the ecosystem. To the contrary, each of these statements supports the notion that estuarine fish have reproductive strategies designed to ensure the continuation of the population despite very large losses of early life stage organisms.

Docket #2-025D is the NJDEP's Public Notice for the 1993 draft NJPDES Permit for Salem. PSEG notes that the Public Notice merely alerts the permittee and the interested public that the NJDEP was proposing to reissue a draft permit for Salem that would include "...the Department's determination pursuant to Section 316(b) of the Clean Water Act regarding the best technology available for the cooling water intake structure for minimizing adverse environmental impact." (Public Notice at page 2.) It goes on to identify the measures proposed as requirements to minimize adverse environmental impact: "intake screen modifications; intake flow limitation; a wetlands restoration, enhancement and preservation program; a fish migration impediment elimination program; the conduct of sound deterrent feasibility study; and the conduct of a biological monitoring program." PSEG does not, believe that the Public Notice provides information, data or analyses relevant to the question EPA posed in the NODA. However, the cover letter transmitting the 1993 Draft NJPDES Permit to interest parties states that "...the Department found that the requirements included in the new [1993] Draft Permit [i.e. the items enumerated above] also minimize impacts from the plant to a level which will assure the protection and propagation of a balanced population of shellfish, fish and wildlife in and on the body of water, as is required by the federal and state Clean Water Acts." This statement clarifies that in

determining whether a given technology minimizes adverse environmental impact, the Department considered the overall status of the aquatic community affected by the Station, by its invoking the balanced indigenous population standard.

In Docket #2-025E, the NJDEP's Fact Sheet/Statement of Basis and revised draft NJPDES permit for Salem issued on June 23, 1993 set forth the basis for its proposed permit. decision. With respect to its proposed determination on adverse environmental impact, the NJDEP's Fact Sheet refers to its 1990 proposed determination that the Station's "intake structure had the potential to cause long-term adverse environmental impact to five of eleven [RIS]…" At the time the 1993 Revised Draft NJDPES Permit was issued, PSEG and the NJDEP still disagreed about the potential for adverse environmental impact from the Station's intake structure. (Fact Sheet/Statement of Basis at 137 of 152) Moreover, the Fact Sheet/Statement of Basis also states that "Section 316(b) requires that an intake structure reflect BTA in order to minimize environmental impact but, further, notes that minimization of adverse environmental impact does not necessarily require that all losses of organisms due to Station operations be eliminated." In the matter of Boston Edison Electric Company (Pilgrim Nuclear Power Station NPDES Permit Nos. MA0003557 and MA0025135). The Fact Sheet/Statement of Basis also stated (at page 141) that the NJDEP determined that the existing cooling water intake structure, screen modifications, a cooling water intake flow limit and a feasibility study of the use of sound to deter fish from the vicinity of the intake structure were BTA and were incorporated into the draft permit (and subsequent final permit). NJDEP expected that these measures would miminize adverse impacts. Furthermore, NJDEP described PSEG's proposed mitigation measures (i.e. wetland restoration, fish ladder installation and additional biological monitoring) as being measures that NJDEP believed would further minimize adverse environmental impacts from Salem's cooling water intake structure, which NJDEP noted, was the objective of Section 316(b).

Docket #2-025F is the NJDEP's response to comment document issued with the Final Permit on July 20, 1994. The NJDEP set forth, in its response to comments, its approach for making determinations under 316(b). Responses 11 and 12 in Docket #2-025F deal with NJDEP's position on adverse environmental impact. In Response 12, the NJDEP took the position that whether its burden was to demonstrate material harm to populations and not merely losses was moot since the permittee had offered to install the measures being required as BTA. The Department went onto provide that the balanced indigenous population was being protected, without addressing squarely whether a finding that the balanced indigenous population was present and protected was tantamount to a determination of no adverse environmental impact. In its Response 11, the Department indicated that "adverse environmental impact" must be interpreted in light of the entire statutory provision and that the use of the word "minimize" clearly indicates that the standard under Section 316(b) is a relative standard and concludes that entrainment and impingement losses are to be minimized to the extent such minimization does not require imposition of technologies whose costs are wholly disproportionate to the benefits to be achieved.

EPA Response

EPA confirms that many of the documents referenced in Section 11.E were available prior to issuance of the draft regulations for new facilities and EPA reviewed these materials.

EPA wishes to respond to the commenter assertion that Salem-related documents “do not support the proposition that entrainment and impingement losses cause long-term, population level declines” in fishes of the Delaware Estuary. First, EPA notes that it has taken no position on the question of whether or not intake losses cause population declines of Delaware Estuary fishes. As the commenter notes, the available data indicate that some fish populations in the estuary have increased in recent years. However, such increasing trends do not demonstrate that Salem has no impact, as the commenter asserts, but only that populations are increasing (for whatever reason). In fact, EPA notes that any potential population-level impact of the Salem station may not be detectable for populations that are showing a strong positive response to relief from other stressors, including substantial improvements in water quality and the imposition of fishing restrictions. This points to one of the limitations of population-level analyses.

EPA would also like to respond to the assertion by the commenter and scientific consultants to PSEG that impingement and entrainment losses are only “adverse” if they can be demonstrated to jeopardize the population. Proving causality for field studies is very complex and difficult due to the numerous factors that can affect the organisms under study. EPA notes that whether an impact is judged “adverse” is a policy decision, not a scientific decision. While science informs the decision-making process, there is no a priori definition of adverse based on scientific considerations alone. In this regard, EPA supports the published remarks of a number of prominent fisheries scientists, as well as William Ruckelshaus, the former Administrator of the EPA, who have stressed the need to separate the assessment process from the politics of decision-making. Please see response to comment 316bNFR.029.013 and section VI.B.2.a of the preamble for EPA’s interpretation of AEI.

Comment ID 316bNFR.523.007

Author Name Maureen F. Vaskis & Mark F. Strickland
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Subject Matter Code 10.11
Request for Comment: Dry Cooling--Proposed Option

In the NODA, EPA requests comment on the capital cost information on wet cooling towers used in EPA's April 23, 2001 memorandum titled, "Supporting Documentation for Unit Costs" contained in #2-037 of the Docket.

PSEG Response:

The estimated installed capital costs for three cooling towers (without the balance of the cooling system) now in development in the northeast for PSEG are: 1) 270 MW steam turbine, lx10 cells, hybrid-60% wet, $6.9M; 2) 310 MW steam turbine, 2x10 cells, 100% wet, $6.0M; and 3) 300 MW steam turbine, 1x12 cells, 100% wet, $7.7M.

EPA Response

EPA appreciates the data submitted by the commenter. The commenter does not specify the type of power plant being constructed, nor the water source (i.e., saline versus freshwater). These factors can influence both the cooling flow and tower size. However, for the sake of comparison, EPA believes it is reasonable to estimate that the examples provided by the commenter represent combined-cycle plants with freshwater sources. Therefore, when the commenter states a particular steam turbine capacity, EPA interprets the overall plant capacity as 3 times this value (the typical ratio of total capacity to steam capacity at a combined-cycle plant is 3 to 1). Based on these factors, EPA presents a comparative analysis of the commenter's two "100% wet" cooling tower costs estimates with those based on EPA costing equations in the following table:

Steam MW	Commenter's Capital Cost	EPA Capital Cost	percent difference
310	$6.0 million	$7.4 million	+ 23 %
300	$7.7 million	$7.3 million	- 6 %

For the case of the wet cooling towers (which form the basis for the technology based flow requirements in the final rule), EPA considers the above analysis to be confirmatory of its cost equations. See Chapter 2 of the Technical Development Document for more discussion of EPA's capital cost equations for wet cooling towers and the verification analysis conducted by EPA to confirm their accuracy.

Comment ID 316bNFR.523.008

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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In the NODA, EPA stated that the proposed regulations would require a permit applicant to complete a "source water baseline biological characterization" based on at least one year of pre-operational biological monitoring proposed 40 CFR 125.86). EPA invited comments on the approach, cost, and time period for such study.

PSEG Response:

A requirement for pre-operational biological monitoring is of great concern to PSEG because of the time (and expense) it would add to the development process for new generating facilities. For example, in New York State, one of the states in which PSEG is developing new plants, a draft NPDES permit must be issued by the Department of Environmental Conservation before the statutory 12-month agency review period begins on a power plant application under Article X, New York's Public Service Law governing the siting of major electric generating facilities. Results of a 12-month pre-operational monitoring program would have to be reviewed before a draft permit could be issued. This would add at least one year to the approval process. PSEG normally plans on a two to three year period to permit and build new plants. In a state like New York, a one-year biological monitoring program would add 25 to 33 % to the approval process time. This approach would thus delay the supply of much needed new generation, add to its cost, and increase the uncertainty of investment in generation assets.

An accurate estimate for costs to conduct the proposed monitoring can be obtained by reviewing costs for on-going monitoring programs. PSEG has conducted monitoring on estuaries for more than 30 years. PSEG believes that the costs and scopes contained in the NODA severely underestimate the effort necessary to adequately represent the potential losses and the associated portions of the populations within an estuary. The following is a summary of the costs and associated scopes for estuarine monitoring conducted between 1998 and 2000:

[see original document for table]

EPA Response

See Response to Comment 316bNFR.501.027.

Comment ID 316bNFR.523.009

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

Subject Matter Code 10.16

Two Track Process

In the NODA, EPA stated UWAG had suggested that EPA consider an alternative to a company seeking to build a new facility. Under this approach, a company could pursue one of two tracks: either (1) to commit to build one or more of a number of technologies deemed to represent a highly protective technology at the outset or (2) to engage in site-specific study to determine the best technology available for the site. EPA invited comment on the industry fast-tack alternative and other options.

PSEG Response:

PSEG supports a fast track alternative for 316(b) decisions for new facilities. This approach would allow progressive companies to install highly protective intake technology in return for a faster and more certain 316(b) approval process. An expeditious and certain process can greatly improve the economics of new plant development, and, in many cases, can offset the extra cost of closed cycle (or equivalent) cooling technology. While site-specific assessment of the biological effects may prove that this conservative technology is more than is necessary to protect aquatic populations, its use would enable our cooling system investment to go towards environmental protection rather than protracted analysis and debate on the acceptability of impacts from a once-through cooling system. Building this option into the rule would provide an incentive for developers like PSEG to build highly protective cooling water intake structures while avoiding costly debate on the level of impact caused by the intake structure.

EPA Response

EPA agrees that the fast track has the advantage of the applicant spending money on environmental protection rather than protracted analysis of what technology should be used at a particular site. See response to comment 316bNFR.509.013 and the preamble to the final rule.

Comment ID 316bNFR.523.010

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

Subject Matter Code 10.16

Two Track Process

EPA asks for comments on the following technology options being considered as part of a fast track approach: 1) dry cooling at all locations, particularly sensitive water body types, or in areas of the country or facility sizes where dry cooling has been well demonstrated; and 2) differing suites of fast track technologies based on water body type or location within a water body. As discussed in II.A. 1 above, PSEG has found no evidence to support a finding that tidal rivers and estuaries require more protection than other water body types. As such, PSEG does not support a fast track technology standard requiring dry cooling for tidal rivers and estuaries, or any other water body type. Other, non-aquatic factors may indicate the need for dry cooling in certain circumstances (e.g., where a cooling water supply simply isn't available), but fall outside the purview of 316(b) regulations. In all but the most unusual circumstances, closed cycle cooling with evaporative cooling towers, or its equivalent, should provide a level of protection beyond what is actually needed to prevent adverse environmental impact and therefore precludes the need for pre-operational or operational monitoring. In defining BTA requirements for a fast track option, PSEG urges EPA to consider creating incentives for redevelopment of existing sites where an older station, typically with a once-through cooling system, is retired as part of the project. Consideration should be given to the reduction in impingement and entrainment associated with the retirement when defining the technology required for the new facility. This would provide an incentive for brownfield development and a reduction in the net impingement and entrainment losses for a site.

EPA Response

EPA has not adopted a fast track approach adopting a dry cooling standard. Instead, EPA has adopted a two-track, technology based approach requiring levels commensurate with that of a closed-cycle recirculating cooling water system. In this approach, EPA believes that Track II provides the opportunity for innovative solutions that would be site specific. See preamble section V for further discussions on why EPA is not adopting dry cooling as best technology available and the basis for today's requirements.

Comment ID 316bNFR.523.101

Author Name Maureen F. Vaskis & Mark F. Strickland
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Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

RELATIONSHIP BETWEEN LOSSES AND CMRS

In general terms, the numbers of fish of a particular population that are killed by entrainment can be thought of as the product of the average abundance of entrainable organisms and the conditional mortality rate for the organisms. This relationship is based on a fundamental equation from fishery science, i.e., the Baranov catch equation (e.g., see Ricker 1975) that describes the number of fish harvested as a function of the fishing rate and the average abundance of the fish being caught:

Harvest=FxN (1)

where F is the fishing rate, and N is the average abundance over the period during which harvesting occurs.

An entrainment CMR is defined in terms of the entrainment "fishing rate" of power plant as:

CMR=1—exp(—F) (2)

Because for small values ofF (e.g., F<0.25), F is approximately equal to CMR (see Figure 1):

F =l — exp(—F), (3)

losses are approximately equal to the product of CMR and average abundance:

Losses =CMR x N (4)

Equation (5) shows that the magnitude of losses depends both on the power plant effect (CMR) and on the population abundance. Population abundance is affected by many factors (e.g., fishing, climatic conditions, pollution) that have nothing to do with effects of power plants. For example, a fish population may increase in abundance, due to regulation of fishing on the adult population, which causes the number of eggs spawned to increase. This increase in spawning stock abundance would be evidence of increasing health of the population that resulted from successful fishery management. The resulting increase in larval fish (and hence average abundance of entrainable organisms) would cause losses to increase, even if power plant operations were unchanged (i.e., the CMR remained constant). In this example a trend of increasing losses would be an indication of improved health of the aquatic resource, not an indication of increased impact due to power plant operation.

The relationships between losses, CMRs and average abundances (described by equation (5)) are illustrated by the estimates of losses, CMRs and average abundances presented in #2-013E (Hudson River DEIS) in the Docket, and are depicted in Figures 2 to 4. The estimates of losses are from Appendix VI-I-D-1, and the estimates of CMRs are from Appendix VI-I-B of #2-013E (Hudson River DEIS). The estimates depicted in Figures 2 to 4 represent combined losses at Indian Point,

Bowline Point and Roseton Steam Electric Stations ("SES"s). Average abundance during the period of entrainment vulnerability is represented by an index of post yolk-sac larval abundance from Appendix V-3 of #2-013E (Hudson River DEIS). The estimates of losses, CMRs and average abundance are for American shad, bay anchovy, striped bass and white perch for the period 1981 through 1987. This is the only period for which losses and CMRs are reported in # 2-013E. Estimates of entrainment losses and CMRs are also presented for river herring, but an index of abundance of larval river herring is not presented in the Hudson River DEIS.

The relationship between estimated entrainment losses and the product of CMRs and average abundances are depicted in Figure 2. As expected, a clear relationship in the empirical data does exist because the entrainment losses are (approximately) equal to the product of the entrainment CMRs and average abundances.

In contrast, no clear relationship is present between losses and CMRs (Figure 3) because losses are based on average abundance and CMRs, not just on CMRs. Similarly, no clear relationship is present between losses and average abundance (Figure 4) because losses are based on CMRs and average abundance, not just on average abundance.

The data EPA is reviewing provides evidence that losses are based on CMRs and average abundance. Accordingly, as the "fishing rate" of a power plant increases, the losses would increase as well. However, an increase in the abundance of a population would also cause an increase in losses. An increase in losses, therefore could indicate an increase in power plant effects on a fish population, or it could indicate an increase in the abundance of the fish population. Because an increase in losses can be caused by an increase in the abundance of a fish population (which would indicate an improvement in the health of the resource), losses are an inappropriate indicator of impact.

EPA Response

EPA agrees with the commenter that the magnitude of entrainment depends on both the abundance of the source population and the "fishing rate" of the power plant. However, EPA disagrees that this precludes the use of entrainment losses as an indicator of impact. Irrespective of whether entrainment is high or low, and irrespective of the factors contributing to the magnitude of losses, the goal of § 316(b)is to minimize losses to the extent that is economically practical and achievable with available technologies.

Comment ID 316bNFR.523.102

Author Name Maureen F. Vaskis & Mark F. Strickland
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Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

INTERPRETATION OF CMRS AS INDICATORS OF POPULATION-LEVEL EFFECTS

A conditional mortality rate for entrainment represents the fractional reduction in abundance of a population at the end of the period of entrainment that is due to the cumulative effects of entrainment from eggs to the end of the period of entrainment vulnerability, assuming no effects of density-dependent compensation. An entrainment CMR does not represent the fractional reduction in abundance of age-1 fish due to the cumulative effects of entrainment. An entrainment CMR does not represent the reduction in abundance of age-1 fish because a reduction in abundance of an early life stage of fish (for any reason) generally will not cause a proportional reduction in age-1 fish. The reason is that density-dependent compensation ameliorates the effects of early life stage mortality. This fact is noted in #2-018B (Richkus CMR memo) in the Docket.

The presence of density-dependent compensation in fish populations and the mechanisms that cause density-dependent compensation are well documented in the scientific literature. That literature is summarized in PSE&G Renewal Application for Salem Generating Station Permit No. NJ00005622 Appendix F (PSEG 1999a, attached) and PSE&G Renewal Application for Salem Generating Station Permit No. NJ00005622 Appendix I (PSEG 1999b, attached) (which are conspicuously absent from the EPA Docket, since Attachments F-1 and F-2 of Appendix F, and Appendix L of the Salem Renewal Application are included in the Docket), and in PSEG Response to ESSA Report (PSEG 2001, attached) (which was provided to EPA on April 5, 2001 and also is not included in the Docket).

The effects of density-dependent compensation on fish populations generally are described in terms of stock-recruitment relationships that depict how the number of age-1 fish produced (often referred to as recruits) varies as a function of the number of eggs produced by the spawning stock. Because the number of eggs produced is closely related to the biomass of spawning fish, spawning stock biomass ("SSB") is often used as a surrogate for number of eggs spawned. The fishery science literature contains several standard stock-recruitment relationships which are noted in #2-020C (Vaughn compensation memo) in the Docket, and are summarized in PSE&G Renewal Application for Salem Generating Station Permit No. NJ00005622 Appendix F (PSEG 1999a) and PSE&G Renewal Application for Salem Generating Station Permit No. NJ00005622 Appendix I (PSEG 1999b) and in PSEG Response to ESSA Report (PSEG 2001). Of the standard types of stock-recruitment relationships (i.e., Bicker and Beverton-Holt), the Beverton-Holt model is more conservative in that the effects of density-dependent processes are assumed, to be more limited in the Beverton-Holt model than in the Bicker model. The Beverton-Holt model was used in the assessment of population-level effects in both #2-013E (Hudson River DEIS) and #2-013C (Salem Application, Attachment F-2). The Beverton-Holt stock-recruitment relationship (see Figure 5) is defined as:

(5) [see original document for equation]

where E is the number of eggs produced by the spawning stock biomass ("SSB"), R is resulting number of age 1 fish (recruits), and alpha and beta are parameters that define the shape of the

relationship.

In the Beverton-Holt stock-recruitment relationship, a reduction in the number of eggs produced always causes a reduction in the number of recruits. Also, the fractional reduction in the number of recruits that is caused by a given reduction in the number of eggs is always lower when the abundance of eggs is high than the reduction that occurs when the abundance of eggs is low (Figure 5).

Assuming that entrainment losses occur before density-dependent processes occur (evidence to support this assumption is presented in the Section IV-B of this comment), an entrainment CMR has the same effect on a fish population as the same fractional reduction in the number of eggs produced. For example, an entrainment CMR of 15% would have the same effect on a fish population as a 15% reduction in the number of eggs produced.

The relationship between entrainment CMRs and the resulting fractional reduction in recruitment (delta R), for the Beverton-Holt stock-recruitment model, is:

(6) [see original document for equation]

where R-prime is the age-I abundance in the presence of entrainment losses, and R is the age-1 abundance in the absence of entrainment losses.

Thus, the fractional reduction in age-1 abundance depends on the.CMR, the egg abundance (E), and the values of the parameters, alpha and beta.

As noted in #2-013C (Salem Application, Attachments F-1 and F-2) in the Docket, the Beverton-Holt model is sometimes re-written in terms of a “steepness” parameter. The steepness parameter (h) is the ratio of: (1) the age-1 abundance that would result from a spawning stock equal to 20% of the unfished spawning stock, to (2) the age-1 abundance that would result from a spawning stock equal to 100% of the unfished spawning stock. Steepness values greater than 0.2 indicate the presence of density-dependent compensation and a steepness value equal to 0.2 indicates no density-dependent compensation. When expressed in terms of the steepness parameter (see Attachment A-1 for the derivation of equation (7)), the fractional reduction in recruitment as a function of an entrainment CMR (for the Beverton-Holt model) is:

(7) [see original document for equation]

where gamma is the egg abundance expressed in terms of a fraction of the egg abundance that would be produced by the unfished spawning stock.

This relationship between CMR and the resulting fractional reduction in age-1 abundance is depicted in Figure 6 for 5 conditions: (1) h equal to 0.2 (i.e., no density-dependent compensation) and y = 100%, (2) h equal to 0.5 (as documented in #2-013C (Salem Application, Attachments F-1 and F-2), 0.5 is a value of h characteristic of species like bay anchovy) and gamma equal to 100%, (3) h equal to 0.85 (as documented in #2-013C (Salem Application, Attachments F-1 and F-2), 0.85 is a value of h characteristic of species like weakfish and striped bass) and gamma equal to 100%, (4) h equal to 0.85

and gamma equal to 40%, and (5) h equal to 0.85 and gamma equal to 20%. The relevance of gamma equal to 20% and 40% is discussed in Section V, below.

EPA Response

The commenter argues that a reduction in abundance of early life stages of fish generally will not cause a proportional reduction in age-1 fish because density-dependent compensation ameliorates the effects of early life stage mortality. However, EPA notes that this conclusion depends on a number of assumptions that often cannot be evaluated with available data. In fact, it is generally considered impossible to test for the existence of compensation in a fish population without a long time series of data (20 years or more). Even if a compensatory effect is detected, it can be very difficult to establish the timing and magnitude of the compensatory response, information that is necessary to draw conclusions about the relationship between CMR's and year class strength for any particular population. For example, even if compensation occurs, the commenter's conclusion that an entrainment CMR does not represent a reduction in age-1 fish will only hold if compensatory processes occur after the period of entrainment. Finally, EPA wishes to note that even in cases where strong compensation is demonstrated, the magnitude of CMR still indicates the extent to which the plant is reducing the compensatory reserve of the population and thus placing the population at risk. Please see response to comment 316bNFR.068.015 and section VI.B.2.c of the preamble for additional discussion of compensation.

Comment ID 316bNFR.523.103

Author Name Maureen F. Vaskis & Mark F. Strickland
Organization PSEG Power LLC

Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

EMPIRICAL DEMONSTRATION OF PRESENCE OF DENSITY-DEPENDENT COMPENSATION

A.Indicator of Presence of Density-Dependent Compensation

For a fish population with a stock-recruitment relationship that is described by the Beverton-Holt model, the ratio of E/R plotted against E will be a straight line with a positive slope:

(8) [see original document for equation]

If density-dependent compensation is not present in a fish population, then the number of age-1 fish is proportional to the number of eggs:

(9) [see original document for equation]

where phi is the constant survival fraction from eggs to age 1.

In this case (i.e., no density-dependent compensation), the ratio of E/R when plotted against E will form a horizontal line with no slope:

(10) [see original document for equation]

The ratio of E/R plotted against E can be used an indicator of the presence of density-dependent processes over the period from eggs to age 1 (Figure 7). Similarly, the ratio of abundance at one life stage to the abundance at a subsequent life stage when plotted against the abundance at the first life stage can be used as an indicator of the presence of density-dependent processes over the period from the first to the subsequent life stage. For example, the ratio ofjuvenile abundance over age-1 abundance plotted against juvenile abundance could be used as an indicator of whether density-dependent processes occur over the period from the juvenile stage to age 1.

B. Hudson River Striped Bass

Data presented in #2-013E (Hudson River DEIS) in the Docket provide empirical evidence for the presence of density-dependent compensation in the Hudson River striped bass stock, and provide evidence on the timing of the occurrence of density-dependent processes. The relationship between the index of yolk-sac larvae ("YSL") abundance (from #2-013E (Hudson River DEIS), Appendix V-3), the life stage of newly hatched fish, and the index of PYSL abundance, the subsequent life stage which lasts for about one month, indicates that density-dependent processes do not occur during these life stages. The ratio of YSL to PYSL indices when plotted against the YSL index shows the absence of a positive slope (Figure 8) which indicates a constant survival fraction from YSL to PYSL that is

independent of YSL abundance. In contrast, the relationship between the PYSL index and the index of age-1 abundance (from #2-013E (Hudson River DIES), Appendix V-3) provides strong evidence for the presence of density-dependent processes between the PYSL life stage and age 1 (Figure 9). The index of age-1 abundance represents striped bass that are roughly twenty months old. Data on juvenile striped bass abundance provide some indication of when the density-dependent processes occur. The ratio of the PYSL index and an index of juvenile abundance (from beach seine sampling in September, when striped bass are three to four months old) indicates the presence of density-dependent processes at some time between these two life stages (Figure 10). The ratio of the index of juvenile abundance to the age-1 abundance index (Figure 11) indicates the continued presence of density-dependent processes occurring between the juvenile life stage and age 1. These data indicate the presence of density-dependent compensation in the Hudson River striped bass stock, and further indicate that the density-dependent processes occur after the PYSL life stage. Data on striped bass losses presented in Appendix VI-I-D-1 of #2-013E (Hudson River DEIS) in the Docket show that the great majority of entrainment losses occur during the egg and larval life stages. Thus, entrainment losses occur prior to the period in striped bass life history when density-dependent compensation operates. Therefore, an entrainment CMR can be represented as an equivalent reduction in egg production, for the purpose of assessing population level effects.

C. East Coast Striped Bass and Weakfish

Data presented in recent fishery stock assessments prepared by the National Marine Fisheries Service ("NMFS") and the Atlantic States Marine Fisheries Commission ("ASMFC"), provide empirical evidence for the presence of density-dependent compensation in the East Coast populations of striped bass and in the East Coast population of weakfish (weakfish have been a focus of 316(b) assessments in the Delaware Estuary). According to the ASMFC stock assessment for striped bass (ASMFC, 1999), the abundance of the East Coast spawning stock of striped bass has increased since 1983. The 30th Stock Assessment Review Committee ("SARC") Report (NMFS, 2000) documents increases in the abundance of theEast Coast spawning stock of weakfish since 1990. Because these stocks experienced dramatic increases in abundance from previously low levels, data on how recruitment changes in response to changes in spawning stock abundance are now available for these stocks.

For East Coast striped bass, the ratio of E/R plotted against E (1983 through 1998) forms a straight line with a positive slope, where E is measured by spawning stock biomass and R is measured by number of age-1 fish, both from ASMFC (1999) (Figure 12). For East Cost weakfish (data from NMFS 2000), a positive slope between the ratio of E/R and E (1990 through 1998) is present, where E is measured by spawning stock biomass and R is measured by number of age-1 fish (Figure 13). The authors of the 30th SARC report (i.e., NMFS 2000) also note the presence of density-dependent compensation, stating "the rapid rebuilding of the stock reflected high estimated compensatory reserve."

EPA Response

EPA agrees with the commenter that data for Hudson River striped bass and Delaware Estuary weakfish suggest that density-dependent compensation may operate in these populations. However, EPA does not agree that these findings should be taken as justification for assuming that compensation

operates in all populations subject to impingement and entrainment. Indeed, EPA notes that there are other cases where fish populations subject to both overfishing and impingement and entrainment have failed to recover once fishing pressure was removed. For example, winter flounder in Mt. Hope Bay, Massachusetts experiences substantial entrainment at the Brayton Point facility, and even though fishing restrictions were imposed several years ago, the population remains depressed.

As a regulatory agency responsible for minimizing risks to aquatic resources from cooling water intake structures, EPA believes that the operation of compensation should only be assumed when it is demonstrated unambiguously for a specific population of concern. EPA notes that such an assessment requires many years of study costing millions of dollars. Even with such substantial effort, EPA is concerned that significant scientific uncertainties often remain, making it difficult to ensure that affected populations are not experiencing harm from impingement and entrainment.

Even when compensation can be demonstrated unambiguously, EPA agrees with the New York Department of Environmental Conservation and other resource agencies that operators of cooling water intake structures possess no inherent right to deplete the compensatory reserve of a fish population. Loss of compensatory reserve can threaten a population's ability to persist in the face of new stressors, either natural or anthropogenic, and as a regulatory agency EPA wishes to avoid this risk. Please see responses to comments 316bNFR.029.013 (interpretation of AEI), 316bNFR.068.015 (compensation), and section VI.B.2 of today's preamble for further discussion of these issues.

Comment ID 316bNFR.523.104

Author Name Maureen F. Vaskis & Mark F. Strickland

Organization PSEG Power LLC

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

INTERPRETATON OF REPORTED ESTIMATES OF LOSSES AND CMRS

As described in previous parts of this comment, data on losses and CMRs are available for the Hudson River striped bass population (for the years 1981 and 1983 through 1987) and the Delaware Bay weakfish population (for the years 1981, 1982, 1996 and 1998). Furthermore, in PSE&G Response to ESSA Report (PSEG 2001), an estimate of the steepness parameter for the East Coast weakfish stocks of h=0.88 is presented. This estimate is based on data in the NMFS stock assessment for weakfish (NMFS 2000). In Appendix VI-4-A of #2-013E (Hudson River DEIS), an assessment of steepness values for the Hudson River striped bass stock indicates that a value of h =0.95 is most likely, given the available data on the stock. These estimates, coupled with an estimate of egg abundance (expressed in terms of the fraction of the unfished egg abundance), are sufficient for estimating the fractional reduction in age-i abundance associated with the estimated losses. In the absence of published estimates of egg abundance (expressed in terms of the fraction of the unfished egg abundance), the benchmark abundance levels of spawning stock biomass from NMFS are used (i.e., SSB as a surrogate for egg abundance).

In 63 Fed.Reg. at 24219, the NMFS provided guidance on the spawning stock biomass that is desirable under the Magnusun-Stevens Act, which established the goal of managing fish stocks to achieve maximum sustainable yield (MSY):

"NMFS believes that a prudent rule can be established as follows: Two of the best known models in the fishery science literature find that, on average, the stock size at MSY is approximately 40 percent of the stock size that would be obtained if fishing mortality were zero (the pristine level). (The actual values are 36.8 percent (Gompertz-Fox model) and 50 percent (Verhulst-Schaefer model)). Also, the fishery science literature contains several suggestions to the effect that any stock size below about 20 percent of the pristine level should be cause for serious concern. In other words, a stock's capacity to produce MSY on a continuing basis may be jeopardized if it falls below a threshold of about one-fifth the pristine level."

Based on this guidance and the observation that the striped bass and weakfish stocks were at depressed levels in the early 1980s, the parameter y from equation (6) is assigned a value of 0.2 i.e., the spawning stock abundance is assumed to be approximately equal to the NMFS stock-jeopardy threshold.

Estimates of the fractional reduction in age-1 abundance (based on equation (7) with h = 0.95 and gamma = 0.2) for the losses and CMRs of Hudson River striped bass for the years 1981 and 1983 through 1987 are presented in Table 1. Estimates of fractional reduction in age-i abundance of Delaware Bay weakfish (based on equation (7) with h = 0.88 and gamma =0.2) are presented in Table 2. These results indicate that large numerical losses do not equate to large population-level effects. For Hudson River striped bass, the estimated entrainment losses (for Indian Point, Roseton and Bowline Point combined) range from 35 million to 183 million organisms per year, whereas the

estimated reductions in age-i abundance range from less than 1% to less than 2%. For Delaware Bay weakfish the estimated annual entrainment losses (for Salem) range from 14 million to 76 million organisms, whereas the estimated reductions in age-1 abundance range from less than 1% to less than 2%. Furthermore, the results indicate that the population-level effects were between 1/6th and 1/15th the effect suggested by the CMRs.

It should be noted that the assumption that the spawning stock abundance is 20% of the unfished abundance likely is not valid for current conditions. Both the striped bass and weakfish stocks have been brought back to desirable abundance levels, so that the spawning stock abundances for these stocks are likely near the NMFS target of 40% of the unfished abundance. As noted above (see Figure 6), for any given CMR, the higher the spawning stock size, the lower the fractional reduction in recruitment will be. Therefore, under current conditions, the fractional reduction in recruitment corresponding to the estimated historical CMRs would be substantially lower than the estimates presented. For example, for Delaware Bay weakfish, if the spawning stock abundance in 1998 were 40% of the unfished abundance, the estimated reduction in recruitment would be 0.80% rather than 1.46%.

Also, because the estimates of fractional reduction in recruitment presented in this comment are based on the Beverton-Holt stock-recruitment model, the estimates are conservative (i.e., likely biased high). If a Bicker or Bicker-type Shepherd model is used (a Bicker-type Shepherd model apparently was used by resource agencies for establishing estimates of maximum sustainable yield for these stocks (NMFS 1998 and NMFS 2000)), the estimates of fractional reduction in recruitment would be substantially lower, possibly indicating no effect at the population level at all.

EPA Response

First, EPA notes that although increases in abundance trends are consistent with the interpretation that populations are not experiencing adverse impacts from anthropogenic stressors, this information is not sufficient for concluding that no impacts are occurring, or for eliminating any particular stressor as an object of concern. For the populations discussed by the commenter, detecting potential impacts of cooling water intake structures is problematic because these populations are currently increasing in response to reductions of other major stressors, including water quality impairment and overfishing. This makes it difficult to detect other potential population responses. Furthermore, EPA notes that even if no population impact is demonstrated, the goal of § 316(b)is to minimize impingement and entrainment to the extent that is economically practical and achievable with available technologies, irrespective of current or projected population-level dynamics. Please see response to comment 316bNFR.507.004 and section VI.B.2 of the preamble for EPA's interpretation of AEI and additional discussion of population-level assessments.

Comment ID 316bNFR.523.105

Author Name Maureen F. Vaskis & Mark F. Strickland
Organization PSEG Power LLC

Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

HISTORICAL TRENDS IN ABUNDANCE

Trends in abundance of the Hudson River striped bass stock and the Delaware Bay weakfish stock support the conclusion that power plant operations in these estuaries have not had an adverse impact on the stocks. Data on Hudson River striped bass PYSL abundance (an indicator of striped bass reproductive effort) from 1974 through 1998 are presented in #2-013E (Hudson River DEIS) of the Docket. Data on Delaware Bay weakfish juvenile abundance from 1980 through 1998 are presented in #2-013C (Salem Application, Appendix L) of the Docket. The Hudson River striped bass data show a dramatic increase in striped bass abundance from 1974 through 1997, which includes the period when Indian Point, Roseton and Bowline Point were operating (Figure 14). Similarly, the Delaware Bay weakfish data show a dramatic increase in weakfish abundance from 1980 through 1998, which includes the period when Salem was operating (Figure 15). The 25 years of Hudson River data and the 19 years of Delaware Bay data are consistent with the conclusion that the historic losses and CMRs have not caused an adverse environmental impact. The discussions in the previous parts of this comment provide an explanation of how these stocks have been able to flourish in the presence of what may appear to be large entrainment losses over many years.

EPA Response

First, EPA notes that although increases in abundance trends are consistent with the interpretation that populations are not experiencing adverse impacts from anthropogenic stressors, this information is not sufficient for concluding that no impacts are occurring, or for eliminating any particular stressor as an object of concern. For the populations discussed by the commenter, detecting potential impacts of cooling water intake structures is problematic because these populations are currently increasing in response to reductions of other major stressors, including water quality impairment and overfishing. This makes it difficult to detect other potential population responses. Furthermore, EPA notes that even if no population impact is demonstrated, the goal of § 316(b)is to minimize impingement and entrainment to the extent that is economically practical and achievable with available technologies, irrespective of current or projected population-level dynamics. Please see response to comment 316bNFR.507.004 and section VI.B.2 of the preamble for EPA's interpretation of AEI and additional discussion of population-level assessments.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Elizabeth Aldridge, J. Brad Burke &
David E. Bailey

On Behalf Of:

Hunton & Williams o-b-o Utility Water
Act Group (UWAG)

Author ID Number:

316bNFR.524

Note

Attachments received with 524 coded as 316bNFR.524, beginning with comment number 200 (Appendix A), 300 (Appendix B) and 400 (Appendix C)

Comment ID 316bNFR.524.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

Organization Hunton & Williams o-b-o Utility Water Act Group (UWAG)

Data entry error. No comment entered.

EPA Response

No Response Necessary.

Comment ID 316bNFR.524.002

Subject Matter Code	17.0
Best Technology Available-Technologies	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

Organization Hunton & Williams o-b-o Utility Water Act Group (UWAG)

Wedge wire screens, fine mesh traveling screens with a fish return system, and Gunderbooms are examples of technologies that can reduce losses from entrainment and impingement to levels reasonably consistent with those of wet closed-cycle cooling with an intake velocity of no more than 0.5 ft/s. Of course, no one suggests that the three can, or should, be used under all circumstances. However, at sites and under conditions for which they are suitable, they are highly effective in reducing entrainment and impingement losses.

Wedge wire screens and Gunderbooms have inherently low approach velocities by design, thereby addressing impingement concerns. Wedge wire screens are designed to have an approach velocity of less than 0.5 ft/s, and the velocity at a Gunderboom is typically so low as to be virtually unmeasurable.

As for entrainment, experience with wedge wire screens and Gunderbooms indicates that they potentially can reduce entrainment losses by over 90%. By way of comparison, EPA stated in the August 10, 2000 proposal that closed-cycle recirculating cooling water systems can reduce water use by 96 to 98% in fresh water and 70 to 96% in salt water, 65 Fed. Reg. 49,087 (2000), though UWAG questioned these figures. If a wet cooling tower reduced intake flow by, for example, 90%, and if we assume that entrainable organisms are uniformly distributed throughout the source waterbody, the tower
would reduce entrainment by 90%, and all the organisms entrained would suffer mortality. This would be no better than a Gunderboom or wedge wire screen that reduced entrainment by 90% or more. Moreover, the effectiveness of Gunderbooms and wedge wire screens may be better than 90%, perhaps approaching 100%. Furthermore, organisms that are entrained into an open-cycle system can experience high survival rates, depending on the species, whereas organisms entrained with the make-up water in a closed-cycle system suffer 100% mortality.

For fine mesh screens, the survival of fish collected on the screens is species- and life- stage-specific. Survival of many species can be very high, exceeding 90% even at velocities above 0.5 ft/s. As for entrainment, the effect of fine mesh screens varies by species, but the data indicate that, if control mortality is taken into account, fine mesh screens can reduce entrainment mortality by 90% or more for some species. Other species, such as bay anchovy, have a high mortality both naturally and after encountering fine mesh screens. Nevertheless, given the present state of knowledge, it is reasonable to include fine mesh screens (with a properly designed fish return system) as a candidate technology that can reduce overall losses to a level (i.e., 90% or better) reasonably consistent with wet closed-cycle cooling.

EPA Response

EPA has evaluated all technologies that are available to minimize adverse impact. In the final rule, for

facilities greater than 10 MGD, EPA is requiring that facilities reduce impingement and entrainment to an equivalent level as that which can be achieved by a closed-cycle, recirculating cooling water system as well as requiring facilities to further reduce impact by limiting through-screen velocity, and requiring design and construction technologies. In addition, further controls are required to prevent facilities from taking a large proportion of the waterbody flow. EPA believes the combination of these requirements is best technology available. However, EPA is not dictating the specific technologies with which a facility must meet these requirements. EPA believes that better controls can be implemented to minimize impingement and entrainment by letting the facility evaluate site specific conditions when choosing appropriate technologies. EPA believes that because the requirements in Track 1 are technically available and economically achievable. Use of other technologies, as comparable, must be demonstrated at a particular site. While these other technologies are promising, and may be applicable at a particular site, EPA's record indicates instances where these technologies may not be equivalent. See Technical Development Document and Preliminary Regulatory Development Section 316 (b) of the Clean Water Act —— Background Paper Number 3: Cooling Water Intake Technologies and Supplement to Background Paper 3: Cooling Water Intake Technologies in Docket #1-5069-PR and #1-5070-PR. These documents support EPA's decision that these technologies need to be demonstrated as comparable at the particular site.

Comment ID 316bNFR.524.003

Author Name	Elizabeth Aldridge, J. Brad Burke & David E. Bailey
Organization	Hunton & Williams o-b-o Utility Water Act Group (UWAG)

Subject Matter Code 10.0

Best Technology Available

The record developed in this rulemaking indicates that the combination of flows associated with wet closed-cycle cooling and low intake velocity reduces entrainment and impingement mortality to such low levels that AEI is avoided altogether rather than "minimized," thereby not just meeting, but exceeding, the § 316(b) standard of protection. But information in the record also suggests that other technologies, including the three named above in Option 2, when properly used, may provide a level of protection within the same range and, thus, also be highly protective of aquatic resources.

EPA Response

EPA understands that the commenter views some technologies as equally effective as the technologies upon which the Track 1 requirements are based. EPA does not believe the record supports this across the board for a number of reasons. However, there may be places where these alternative technologies do reduce impingement morality and entrainment comparably to the Track 1 requirements; thus the rule authorizes permit writers to allow a Track II suite of technologies to be applied where this is demonstrated. An example of where the proposed technology, e.g., wedgewire screen would not fit across the board as equivalent to dynamic flow requirements would be an area where there is high debris loading, attached growth, or where the appropriate counter-currents do not exist. Also, the technology may not be appropriate for large facility application as they have never been installed. However, in certain areas, that meet the limitations of the design, it may be demonstrated to be equivalent. Regarding the gunderboom, EPA does not yet believe that it is an adequately demonstrated technology, see elsewhere in this comment response document; however, it may work in all waterbodies where there is limited wave action and where the barrier can be maintained in place. Finally, the fine mesh traveling screens and fish handling systems offered by the commenter may not generally equal to the Track 1 requirements because survival is highly species-specific and life-stage dependent.

Under the two-track approach adopted in the final rule EPA does not mandate a specific technology. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. The rule allows facilities to determine which technologies are most appropriate at their site to meet the performance requirements as listed in Section 125.84. EPA believes that the rule requirements will achieve the objective of 316(b), which is to require the use of best technology available to minimize (i.e., reduce to the smallest amount, extent, or degree reasonably possible) adverse environmental impact.

EPA believes that reduction in impingement and entrainment under the final rule will vary somewhat due to several factors, but that the highest levels of reduction will represent substantial improvement

over facilities that do not use BTA to minimize AEI.

Comment ID 316bNFR.524.004

Subject Matter Code	10.02
	Authority to Limit Intake Flow

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

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Closed-cycle cooling and extremely low approach velocities have been used to avoid levels of entrainment and impingement mortality that could cause AEI. UWAG believes that EPA lacks the authority to require closed-cycle cooling, because it is not an "intake structure technology" as that term is used in § 316(b). Also, EPA cannot support a finding that closed-cycle cooling with a low approach velocity constitutes BTA because of factors such as very high capital and other costs compared to
environmental benefits, cross-media environmental effects (such as noise, land constraints, consumptive water use, aesthetics, or habitat or air emissions concerns), and site-specific factors. Indeed, such low flows and velocities are far more conservative than necessary to meet the statutory standard of "best technology available to minimize adverse environmental impact."

The Two Track approach avoids these problems by not defining these technologies as BTA for "minimizing" AEI, but instead determining that they avoid AEI altogether. Using this approach, the rule would reflect EPA's determination that, where the permittee proposes to use a demonstrated technology meeting the above criteria (presumably after making its own determination that the site will accommodate the technology and that it can be used cost-effectively), the technology would avoid AEI at virtually every site in the country, thereby exceeding the requirements of § 316(b).

In addition, the rule should not foreclose – rather it should encourage – alternative or innovative intake structure technologies. If a proponent of a new facility knows of an alternative technology but cannot try it without extensive pre-operational site-specific studies, he will be disinclined to take the risk of developing the new technology. To remove this disincentive, EPA should allow expedited permitting when an applicant can demonstrate, as part of its permit application, that the intake structure technology it proposes will achieve a level of protection reasonably consistent with the criteria established in Option
1 above. Such a demonstration would not require source waterbody studies, but might instead be based on successful use of the innovative technology at a comparable site or successful testing in a laboratory or a pilot-scale trial. Some monitoring after the facility begins operating may be appropriate to validate the design performance of the alternative technology.

EPA Response

EPA disagrees. See response to comments 316bNFR.068.010, 316bNFR068.104 and the preamble to the final rule. EPA has not adopted the industry two track for the reasons discussed in the preamble to the final rule and elsewhere in this comment response document. The technologies cited by the commenter do not represent best available technology for minimizing adverse environmental impact because other available and economically practicable technologies(that have acceptable non water quality environmental impacts) are more effective at reducing impingement and entrainment on a

national basis than those cited by the commenter. Track II, however, provides a mechanisms for applicants to show at a particular site that an alternative suite of technologies does result in comparable performance. EPA believes that the Track II mechanism will provide flexibility to applicants to demonstrate comparable performance and that it will encourage the development of innovative technologies. A technology-based approach does not require EPA to demonstrate environmental impacts in the receiving water. See 316bNFR.068.007, 316bNFR.068.008.

Comment ID 316bNFR.524.005

Subject Matter Code	7.2
Definition: Cooling Water Intake Structure	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

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Water Should Be Defined as "Cooling Water" Only if 75-100% of it Is Used for Cooling

In Part II.A of the NODA, 66 Fed. Reg. 28,854, EPA raises two issues about "regulatory thresholds." The first is how to define when water used for several purposes should be regulated as "cooling" water. In its comments of November 9, 2000 ("UWAG November 2000 Comments"), UWAG recommended that an intake of water be considered "cooling water" if between 75 and 100% of it is used for cooling. The Department of Energy ("DOE"), in its recent comments on the NODA, recommends a level of no less than 50%.

If a facility uses only part of the water it withdraws for cooling purposes, how big a percentage of the water must be used for cooling before the withdrawal should be called "cooling water" and be subject to the requirements of the § 316(b) rule? EPA apparently is considering making its choice based on how many water users will be swept into the rule's coverage. For example, EPA notes (66 Fed. Reg. 28,854 col. 2) that, if the threshold were set at more than 50%, then 49% of manufacturing facilities would be subject to the rule. The focus seems to be not on what Congress meant by "cooling water intake structures" in § 316(b) but on ensuring that the Agency asserts authority over a large number of facilities.

The problem with this approach is that Congress gave no indication that it was interested in regulating some percentage of water users. What it said was that it intended to regulate "cooling water intake structures." Considering the plain meaning of the words, UWAG submits that an intake structure does not qualify as a "cooling water intake structure" if less than half of the water withdrawn is used for cooling, and that the most logical conclusion is, as stated in the UWAG November 2000 Comments, that Congress intended that the "vast majority" of the water withdrawn should be used for cooling before it can be called "cooling water." UWAG repeats its recommendation that EPA use a value between 75 and 100% as the threshold.

EPA does not address in the NODA the question the Agency raised in its proposed § 316(b) rule as to whether that rule would apply to the intake of a municipal water supplier that sold some of its water to one or more new facilities for cooling. EPA should clarify that it does not. If the EPA rule were to be applied to general-purpose water suppliers, some of whose product ended up as cooling water for their customers, it could increase greatly the burdens on and costs incurred by municipal water suppliers, and it might well induce them to refuse to sell water to utilities for cooling purposes. At a minimum it likely would significantly affect municipal water suppliers and the cost of treated water, costs that EPA has not made any attempt to analyze.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold. EPA believes this approach best effectuates the statutory objective of section 316(b), to minimize adverse environmental impact at cooling water intake structures.

Regarding the use of municipal water for cooling purposes, section 125.81(b) of the final rule clarifies that use of cooling water does not include obtaining cooling water from a public water system. Thus facilities that obtain cooling water from a public water system are not subject to the rule.

Comment ID 316bNFR.524.006

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

Organization Hunton & Williams o-b-o Utility Water Act Group (UWAG)

A Reasonable Threshold Flow Should Be Defined

The second issue about regulatory thresholds is what should be the volume of cooling water that is sufficiently small that it need not be regulated by this § 316(b) rule. UWAG supports including in the rule a threshold, in the interest of focusing on water withdrawals that are important as distinguished from those that are trivial. However, UWAG believes that the 2 million gallons per day ("MGD") threshold originally proposed by EPA is too low.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies.

EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. Without clear thresholds such site-specific determinations are more burdensome for both the regulatory agency and the facility. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

For further discussion of these points, see Section VI.A.3 in the rule.

Comment ID 316bNFR.524.007

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

Organization Hunton & Williams o-b-o Utility Water Act Group (UWAG)

The Threshold Should Be Based on Science

EPA appears to be focused (66 Fed. Reg. 28,854 col. 3) on choosing a threshold that sweeps a large percentage of water users under the rule. This is the wrong approach. The de minimis threshold should be chosen based on science, that is, on data showing what level of water withdrawal is so low that it will not likely have a significant impact on the aquatic community. The Electric Power Research Institute ("EPRI") is preparing a study, which it expects to complete this summer, that will help answer this question. EPA should take this study into account in choosing a regulatory threshold. Certainly, nothing in the record or analysis EPA has compiled to date suggests that a threshold as low as 2 MGD would be needed to protect against AEI. Indeed, it suggests just the opposite. For example, later in the NODA, EPA says it is considering information that, in its view, might be interpreted to suggest that entrainment and impingement may be a non-trivial stress on a waterbody. 66 Fed. Reg. 26,861-62. For the reasons discussed below at III.E.5.b, UWAG does not believe that that information in fact supports the proposition for which EPA has offered it. But even if it did, none of that information suggests that plants with flows below 763 MGD<fn4> could cause such effects. That figure is the lowest total flow from among the facility reports cited by EPA.
See 66 Fed. Reg. 28,862.

EPA also says elsewhere in the NODA that it is considering defining "adverse environmental impact" as the level of effect that would occur if a facility used those cooling water intake technologies that EPA claims Congress would have understood were "traditional" when the Clean Water Act was passed in 1972. 66 Fed. Reg. 28,863 col. 1.

EPA says those technologies consist of once-through cooling with simple traveling screens and trash racks. Id. For the reasons explained below at II.E.7, UWAG does not believe this in and of itself is a sound approach to defining AEI for regulatory purposes. But even if it were, it suggests that Congress would have considered facilities using closed-cycle cooling to be unlikely to cause AEI. Flows associated with closed-cycle cooling will vary substantially among sites, depending on the cooling needs of the plant and water quality and atmospheric factors. But one thing is clear – cooling water flows associated with use of wet recirculating cooling at all but the smallest facilities normally far exceed 2 MGD and can range to more than 100 MGD. If EPA were to pursue this analytical framework (which UWAG does not believe it should), it would suggest
that the regulatory threshold should be far higher. In any case, it demonstrates forcefully why EPA needs to move away from an approach that simply sweeps in a large portion of all CWISs.

EPA Response

EPA believes it has established a reasonable threshold for the applicability of these rule. EPA

believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold.

EPA did not select a significantly higher threshold, such as 15 or 25 MGD or higher, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 15 MGD, 32 percent of the manufacturers, 29 percent of the nonutilities, and 50 percent of the utilities would be covered, as would 97.3 percent of the total flow. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. While at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgment basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III of the rule, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

As of the publication of this final rule EPA has not received results of the studies referenced in the comment. For further discussion of these points, see Sections VI.A.3 and VI.B. of the preamble to the final rule.

Comment ID 316bNFR.524.008

Author Name	Elizabeth Aldridge, J. Brad Burke & David E. Bailey
Organization	Hunton & Williams o-b-o Utility Water Act Group (UWAG)

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The Maryland Approach Has Some Sound Concepts, But Is Not Ideal

EPA also is considering the regulations of Maryland, which exclude CWISs withdrawing less than 10 MGD if the volume is less than 20% of the design stream flow (for nontidal waters) or less than 20% of the annual average net flow past the point of discharge that is available for dilution (for tidal waters).

UWAG supports the Maryland concept of having a threshold criterion, though 10 MGD or 20% of flow may be unnecessarily low. As UWAG said in its November 2000 Comments, the recent assessment of § 316(b) implementation in Maryland suggests that its program has worked well to protect state resources. UWAG November 2000 Comments, p. 84, citing Richkus 1998. Certainly the Maryland threshold is better than EPA's originally proposed 2 MGD, which is both arbitrary and too low.

The use of 20% of ambient flow as a safety factor, overriding the 10 MGD threshold for small waters or very big withdrawals, is prudent. It shows how conservative is the proposed 1%/5% screening factor in the Two Track process.

Another desirable aspect of the Maryland approach is the method of assessing costs using the American Fisheries Society values to determine the value of fish losses. As Maryland does, the EPA rule should require a comparison of benefits and costs before technology requirements are imposed. DOE, in its recent comments on the NODA, says that the intake flow threshold should be larger than 2 MGD so as to exclude facilities with closed-cycle cooling, which need an intake of more than 2 MGD for make-up water to replace normal blowdown streams. DOE recommends that the flow threshold be no less than 25 MGD. If EPA refuses to set a threshold of 25 MGD or higher, DOE prefers, as a second-best alternative, a threshold based on the Maryland model.

With respect to the regulatory threshold, EPA also requests comment on whether plants below the threshold should be considered outside the scope of § 316(b) jurisdiction, or should simply face regulation on a best professional judgment basis, as EPA previously had proposed. UWAG recommends that EPA set a threshold below which, as a matter of fact and law, any new CWIS is not likely to cause AEI. Almost by definition, then, a withdrawal below this threshold would not cause AEI, and no protective measure would be either necessary or authorized by § 316(b). In the unlikely event that this safe threshold should ever prove inadequate at a particular site (because a proposed small withdrawal would threaten an endangered species, for example, or be taken from an uniquely sensitive spawning area), permitting authorities would have authority under statutes other than § 316(b) (the Endangered Species Act, for example) to take extraordinary steps to forbid or modify the intake.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. EPA did not select a 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under this threshold and would leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. Under a threshold of 10 MGD, only 38 percent of manufacturing and 28 percent of nonutility facilities would be covered.

No percentage flow threshold has been added to the applicability provisions of the final rule. Rather, source water proportional flow requirements that have been demonstrated to be achievable at new facilities exist in the final rule (as one of several BTA requirements). With regard to costs, CWA section 316(b) focuses on using best technology to reduce impacts. The statutory provisions, along with existing regulatory requirements, define how and the extent to which EPA can consider costs and benefits in establishing BTA requirements. Finally, EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ.

For further discussion of these points, see Section VI.A.3, VI.C, and VI D of the preamble to the final rule.

Comment ID 316bNFR.524.009

Author Name	Elizabeth Aldridge, J. Brad Burke & David E. Bailey
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Subject Matter Code 8.1

Identification of New Steam Electric Facilities

Gas-Fired Combined-Cycle Electric Power Plants

In Part II.B.1 of the NODA, EPA asks for information on the number and size of combined-cycle electric generating facilities to be built over the next 20 years. 66 Fed. Reg. 28,855-56. EPA notes that DOE has raised its estimate of the rate of increase in growth of demand for electricity over the next 20 years from 1.3% to 1.8%. 66 Fed. Reg. 28,854 col. 3. This is a significant increase; 1.018 versus 1.013 compounded over 20 years amounts to more than a 42% increase in demand rather than a 29% increase. DOE also projects that new generating capacity will be needed sooner than previously thought. 66 Fed. Reg. 28,854 col. 3.

The implication is obvious: the new rule is going to cost far more than EPA originally thought. As EPA says, "more facilities than estimated at proposal would need to bear costs to comply with final regulations similar to the proposal." 66 Fed. Reg. 28,855 col. 2.

In an effort to assess how much of this new capacity would be subject to the regulations and what types of generating plants might be involved, EPA once again has consulted the NEWGen Database, a proprietary database maintained by Resources Data International, Inc. ("RDI"). EPA says that, as of the time of proposal, that database contained information on about 94 combined cycle facilities (only 56 of which EPA analyzed, because it could not readily obtain information on the cooling water sources for the remaining 38), but now contains information on 323 potentially in-scope facilities, which are likely to be built over a seven-year period. Even this number may be far below the actual number of new facilities that will be built. Indeed, the May 2001 Report of the National Energy Policy Development Group ("NEPDG") estimates that over the next twenty years the United States will need between 1,300 and 1,900 new power plants, which is the equivalent of 60-90 power plants per year. NEPDG Report, p. 1-5.

EPA also should pursue other credible data sources as a means of ensuring the most reliable estimate of the amount and type of new capacity likely to be affected by the rule. For example, Energy Ventures Analysis, Inc. ("EVA") tracks and maintains current data on planned new capacity. The Edison Electric Institute ("EEI"), a member of UWAG, has commissioned an analysis of that proprietary database so as to provide EPA with the most current statistics on new capacity and presents that
analysis in its comments. Through June 2001, EVA has collected data on 710 natural gas combined cycle projects with a total capacity of 371,547 MW. Of these, 403 units, with a capacity of 230,376 MW, are under construction, considered "highly likely" to materialize, or considered promising but in early stages of development. See EEI NODA comments, attaching EVA's report, Characterization of New Powerplant Development and the Potential Effect of EPA's § 316(b) Regulations on New Powerplant Development (June 18, 2001).

EVA surveyed top developers of new natural gas-fired capacity to determine what kind of cooling was designed for the new units, the source of the cooling water, and the reasons for cooling water selection. This survey showed that 56.5% of the projects reported being directly or indirectly impacted by EPA's § 316(b) regulations. Another 27.4% may potentially be impacted, though it is impossible to know for sure because the cooling system designs for these projects have not been completed or the water will be purchased from a third party.

This finding that 57-84% of new natural gas combined cycle plants will potentially be affected by § 316(b) regulations is, as EVA says, significantly different from EPA's initial estimate in the NODA of 15%. Also, an undetermined number of projects that have not yet been announced will likely be affected.

EPA says that it is still in the process of analyzing these new data and offers no analysis of them. 66 Fed. Reg. 28,855 col. 2. Given the number of data points involved, the lack of any EPA analysis or summary and the very short comment period, UWAG has not had any meaningful opportunity to critique or comment on the data.<fn5>

EPA also suggests that it is in the process of consulting a number of other data sources as a supplement to its review of the NEWGen Database. For example, EPA says that it is analyzing responses to the Detailed Questionnaires it sent to a number of power generating and manufacturing facilities, and provides a preliminary assessment of that data. 66 Fed. Reg. 28,855 col. 3. EPA does not, however, make available any of the raw data. Therefore, UWAG has no way of assessing the reliability of EPA's figures.

EPA Response

EPA believes that the commenter misunderstood the methodology used to estimate the number of impacted new combined-cycle facilities. EPA did not base the number of new combined-cycle facilities on the facilities listed in the NEWGen database. Rather, EPA only used the NEWGen facilities to develop cooling water characteristics of new in-scope facilities. These characteristics were then applied to the forecasted capacity additions published in the Energy Information Administration's Annual Energy Outlook 2001 (AEO2001) to estimate the number of in-scope facilities. For a full description of EPA's methodology used to estimate the number of affected facilities please see Chapter 5: Baseline Projections of New Facilities of the Economic Analysis document.

For the final rule analysis, EPA used the AOE2001 to determine total projected steam electric capacity additions. The AEO2001 is based on the 1.8% growth in demand for electricity cited by the commenter.

Finally, EPA is aware of the analysis submitted by EEI which was conducted by Energy Ventures Analysis (EVA). A full response to EVA's analysis can be found in response to comment 316bNFR.525.201 in comment category 22.1.

Comment ID 316bNFR.524.010

Subject Matter Code	8.2
Identification of New Manufacturing Facilities	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

Organization Hunton & Williams o-b-o Utility Water Act Group (UWAG)

Coal-Fired Power Plants

EPA also asks for information about new coal-fired steam electric generating facilities. 66 Fed. Reg. 28,856 col. 1-2. There are good reasons to believe that EPA has seriously underestimated the number of new coal-fired electric generating facilities likely to be built in the years 2001-2020. To begin with, EPA has assumed there will be no new coal-fired plants at all from 2002-2010, even though the updated NEWGen database shows 17. Also, other sources of information strongly suggest that an even greater number of coal-fired plants are likely to be built both from 2001 to 2010 and thereafter. The EVA report for EEI shows that 26 coal-fired power plants currently are planned for development. See EEI NODA Comments. Of these, all but two are likely to need cooling water. Even information this recent probably is outdated, given the rapid pace at which energy developers are planning new projects and responding to market demands. Other information, such as the emphasis the NEPDG report places on pursuing additional coal-fired generation, suggests that these numbers are, if anything, low. NEPDG Report, pp. 5-13-5-15. Taken together, this information clearly demonstrates the need for EPA to take a hard look at its assumptions and to use all available data sources to develop more accurate projections.

The EVA data, discussed in EEI's comments and referred to above, suggest that more coal-fired power plants will be affected by the new rules than the 44-59% that EPA estimates and that biomass combustion and geothermal projects will also be affected.

EPA Response

EPA has updated and revised the forecast of the number of new coal facilities subject to the final rule. For the final rule analysis, EPA used capacity additions from the AEO2001, which projects more coal capacity additions (21.8 GW) compared to the AEO2000 (17.2 GW), which was used for the proposal analysis. The AEO2001 also projects coal additions earlier than the AEO2000 did, with 18.5 GW (or 85 percent of the 20-year forecast) projected between 2001 and 2010. At the request of the U.S. Department of Energy, EPA also conducted a sensitivity analysis related to new coal capacity. Based on information provided by DOE, EPA increased the coal capacity additions expected between 2001 and 2020 from 21.8 GW to 30 GW. This sensitivity analysis resulted in the addition of 13 new coal facilities, 5 of them in-scope of the final rule.

The EVA report submitted as Appendix C by EEI contends that 20,860 MW of coal-fired projects are expected between 2000 and 2013. EVA acknowledges that 77 percent of this capacity has only recently been announced and is "expected to be highly 'fluid' as to their status over the next several months." Even assuming that all of this new capacity will be built, this number is very close to the AEO2001 projection of 19,380 MW used by EPA (and lower than the assumption used for the

sensitivity analysis). EPA therefore believes that the EVA report supports EPA's analysis for the final rule.

EPA also evaluated the statement that 26 coal-fired power plants coal-fired power plants currently are planned for development. The EEI NODA comment acknowledges that of these, eight are being sited at existing powerplants. This leaves 18 new greenfield or stand-alone plants. Again, EPA believes that this estimate supports EPA's analysis for the final rule, which projects that between 2005 and 2007, 25 new greenfield or stand-alone coal plants will begin operation.

The commenter further claims that all but two of these new coal plants would require cooling water. EPA agrees that in the absence of a dry cooling system, new coal plants will require cooling water. However, EPA wishes to point out that the cooling water required by these new plants will not be subject to section 316(b) regulation, if it comes from a source other than a water of the U.S.

Finally, the commenter claims that biomass combustion and geothermal projects will also be affected by the rule. Please see EPA's response to comment 316bNFR.525.202 in comment category 21.2.

Comment ID 316bNFR.524.011

Subject Matter Code	24.2
	EEA - Estimation of Unit Costs

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Use of EEA Cost Methodology

EPA also says that it is considering applying the costing methodology described in EEA Chapters 5 and 6 of the Economic & Engineering Analysis ("EEA") and Appendices A and B to the NEWGen data in order to develop cost estimates for the additional facilities likely to be built over the next twenty years. UWAG continues to have serious concerns about the validity of that methodology, which our November 2000 Comments showed contained a number of errors. For example, UWAG objected to EPA's failure to (1) specify accurately technologies capable of achieving the proposed velocity limitation (UWAG November 2000 Comments, p. 177); (2) specify accurately and account fully for the costs of adding additional fish protection technologies for estuarine/tidal river facilities and other facilities within the littoral zone of an ocean, freshwater river or stream, or lake or reservoir (Id. at pp. 200-02);<fn6> and (3) account accurately and fully for the costs of installing wet or dry cooling. Id. at p. 185, p. 206, Appendix F. Elsewhere in the NODA, EPA provides supplementary information in response to some of the comments it received with respect to calculating the costs of wet recirculating cooling systems. See 66 Fed. Reg. 28,866-67. UWAG does not agree that that information resolves the issues raised, but we will deal with those issues later in these comments.<fn7> See below at II.G.2. But nowhere does EPA indicate whether or how it has amended its cost methodology to address the issues UWAG raised in its November 2000 Comments. We urge EPA to re-examine thoroughly its cost methodology and assumptions before proceeding further with its analyses.

EPA Response

(1) Regarding the technology basis for the velocity limitation of the final rule see response to comment #316bNFR.068.097.

(2) Regarding the costs of additional fish protection technologies and the littoral zone see response to comment #316bNFR.068.109.

(3) Regarding EPA's cost estimates for wet and dry cooling see responses to comments #316bNFR.068.100, #316bNFR.068.111, and #316bNFR.368.001 through #316bNFR.368.012.

Comment ID 316bNFR.524.012

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

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Tidal Rivers and Estuaries

In Part II.D.1 of the NODA, EPA requests comments on the sensitivity of tidal rivers and estuaries. 66 Fed. Reg. 28,857 col. 1-3. EPA recites comments that many aquatic organisms in tidal rivers and estuaries have reproductive strategies that rely on open-water dispersal of a very large number of eggs and larvae and that, even without cooling water intakes, most of the early life stages do not survive to a reproductive age. 66 Fed. Reg. 28,857 col. 1. EPA also acknowledges the principle of compensation, noting that increased survival of early life stages can lead to increased competition among later-stage juvenile and adult organisms and may actually reduce, not increase, populations. Id. On the other hand, EPA notes its earlier assertion that estuaries deserve the most stringent protection because of the abundance and diversity of aquatic life they harbor and because estuaries are an important habitat for the "vast majority" of commercial and recreational important species of finfish. 66 Fed. Reg. 28,857 col. 2.

UWAG said in its November 2000 Comments that EPA should not presume that estuaries and tidal rivers are more sensitive than other aquatic ecosystems, because estuaries and tidal rivers are heterogeneous and contain areas of both high and low biological productivity. UWAG November 2000 Comments, pp. 148-51.

UWAG also pointed out in its November 2000 Comments that fish populations can and do offset substantial levels of human-caused mortality through compensatory increases in the growth, survival, and reproductive rates of the surviving organisms. See UWAG November 2000 Comments, Sections VII.F, H; Appendix B. As Appendix B to the UWAG November 2000 Comments pointed out, standard fisheries management principles used to calculate factors such the maximum sustainable yield ("MSY") for a given species show that mortality of early life stages may have little or no meaningful impact on abundance or yield. Reducing existing levels of entrainment and impingement of such species will provide little or no increase in abundance or yield. UWAG November 2000 Comments, p. 66.

One document cited by EPA in the NODA, DCN#: 2-013L, is a memo from Dave Cacela of Stratus Consulting to J.T. Morgan, dated April 20, 2001. 66 Fed. Reg. 28,857 col. 3. It discusses an ongoing research project being done by Stratus with the following working hypothesis: "ambient early life stage density and entrained early life stage density will often be equal or directly proportional." In the memo, Cacela graphs Brayton Point ambient/entrained densities and concludes that there is a statistically significant correlation.

UWAG does not disagree that there is often some level of correlation between ambient densities and entrained densities. But making this sometime correlation into an assumption that wholly ignores the site-specific factors that govern entrainment is not justified. UWAG also does not agree that the

correlation alone justifies strict regulation of flow, without considering potential population effects. EPA also cites another Stratus memo (to Blaine Snyder and J.T. Morgan, from Adrienne Gret of Stratus, dated April 5, 2001), designated DCN#: 2-013O. Using Brayton Point data, the author finds a "weak" statistical correlation between densities of ambient flounder and entrained flounder, which "indicates that it would be difficult to use flounder larvae density estimates . . . to predict accurately flounder larvae density in the Brayton Point intake water." She adds that "the validity of using Brayton Point data to make inferences about density estimates for other facilities is highly uncertain" and lists factors contributing to that uncertainty. Thus, this document suggests, as UWAG has asserted repeatedly, entrainment impacts are site-specific, and entrainment estimates normally must be interpreted in a site-specific, population-based framework.

UWAG also would like to emphasize the following points:

-While tidal rivers and estuaries support high densities of pelagic fish and these species are vulnerable to entrainment and impingement, this vulnerability does not automatically equate to population-level impacts. Some of the most extensive § 316(b) studies have been conducted in estuaries, and those studies tend to confirm that high density does not translate into population-level impacts from entrainment and impingement.

-Although densities of eggs and larval fish in estuaries is high relative to other waterbodies, their natural survival rates are lower. Also, growth rates of young marine fish are higherwhen densities are lower.

-Compensation is a well-documented property of population regulation. Despite 30 years of studies regarding fish population response to entrainment and impingement losses, there is no evidence that power plant impacts alone can reduce a population's compensatory reserve. Overfishing, by comparison, frequently depletes a population's compensatory reserve. In the absence of fishing, stocks can rebound in population size and rebuild their compensatory reserve. Rejuvenation of striped bass and silversides in the Hudson River illustrates this point.

EPA Response

The final rule consists of a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Therefore, the discussion regarding whether or not estuarine and tidal river environments are more sensitive to CWIS impacts or whether these environments are richer in terms of abundance and diversity of aquatic life is no longer relevant to the regulatory framework of the. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones. Thus, all intakes will be subject to the same technology-based performance requirements that seek to minimize entrainment and impingement. Should a facility choose to follow Track II of today's rule, they can show that site-specific conditions and/or applied technologies will allow them to achieve a level of reduction in impingement and entrainment comparable to that achieved under Track I. Thus, today's rule provides a flexible option

for facilities that do not project high impingement or entrainment losses within their respective waterbodies.

EPA disagrees with the commenter's objection to the generalization that entrainment is proportional to intake flow and that high ambient densities can relate to high impingement and entrainment rates . EPA notes that in cases where entrainment data are unavailable (e.g., prior to a facility going online) it is common practice to estimate potential entrainment based on this assumption. As an example, when the Hope Creek facility in the Delaware Estuary was originally being permitted, the Nuclear Regulatory Commission predicted entrainment rates by assuming that entrainment would be directly proportional to intake flow and larval densities near the facility. In fact, entrainment monitoring at this facility has never been required because of the assumption that entrainment will be low because intake flow is low.

While EPA wishes to reiterate that, as a first approximation, it can be assumed that entrainment at a proposed facility will be proportional to intake flow, EPA has also been careful to point out that site-specific conditions can modify this relationship. For this reason, EPA advocates careful monitoring of actual impingement and entrainment rates once new facilities commence operations.

EPA considered the issue of compensation and CWIS impacts on estuaries in today’s rulemaking see responses to comments 316bNFR.039.010 and 316bNFR.056.035.

Comment ID 316bNFR.524.013

Author Name	Elizabeth Aldridge, J. Brad Burke & David E. Bailey
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Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

Some of the documents EPA included in the docket as possible support for its assertion that estuaries may be more sensitive than other waters relate to five plants: one in New Jersey (the Salem facility), three in New York (Indian Point, Bowline and Roseton, which were studied collectively given their proximity on the Hudson River), and one in Massachusetts (Pilgrim). 66 Fed. Reg. 28,857 col. 3. EPA also suggests that studies cited elsewhere in the NODA, in sections dealing with assessment of AEI and susceptibility of non-tidal rivers and streams, might provide further support for EPA's assertion (although the Agency does not specify which studies those might be).

UWAG does not believe that any of the studies EPA cites prove the proposition that the Agency advances. While the comment deadline does not permit a detailed review or exegesis of those studies, which are quite voluminous, UWAG notes that its November 2000 Comments refuted allegations of significant population-level impacts for a number of plants, including Salem, Indian Point, Bowline, and Roseton. See UWAG November 2000 Comments, Appendix I.

Even if this were not the case, the studies EPA cites hardly present a complete and unbiased picture of sensitivity of estuarine sites to cooling water intake effects. In this section, EPA covers only five sites (Salem, Indian Point, Bowline, Roseton, and Pilgrim). In sections D.5 and E, to which EPA cross-references, the Agency includes one or more studies for an additional six sites, one of which (John Sevier) is a freshwater site. Of the remaining sites, two are in California (Diablo Canyon <fn8> and Moss Landing); one in New York (the Charles Point Resource Recovery Facility); and two are in Florida (Big Bend and Crystal River). EPA also includes a paper by William Richkus (a consultant to EPA on this rule) and Richard McLean, which provides an overview of power plant entrainment and impingement impacts assessment on the Chesapeake Bay and generally concludes that AEI has not occurred. See DCN#: 2-018E. This sample reflects data on estuarine sites in only five states.

Even if the existing facilities that EPA examined were representative of the new facilities that are the subject of this rule (which they demonstrably are not) or of other existing facilities (and again, there is no evidence that they are), their number is so small as to be suspect. EPA says that, based on its initial review of the Detailed Questionnaire, there are 566 in-scope existing power plants, of which it says 61 facilities are on estuaries or oceans, and 339 are on a non-tidal river, stream, or tidal river. Obviously, some portion of facilities falling within the river/stream category belong in the "estuary/tidal river" category that EPA proposes to define for purposes of this rule. If one assumes, conservatively, that only ten percent of the 339 river/stream facilities are in fact located on tidal rivers and, thus, would fall within EPA's proposed estuary/tidal river category, the number of covered facilities in that category swells to 100. EPA's review of only a very small number of very high-profile plants in a few states simply does not reasonably represent the likely impacts of existing facilities, much less of likely impacts of new facilities, on estuarine sites.

EPA Response

The final rule consists of a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Therefore, the discussion regarding whether or not estuarine and tidal river environments are more sensitive to CWIS impacts or whether these environments are richer in terms of abundance and diversity of aquatic life is no longer relevant. See response to comment 316bNFR.025.003.

With respect to the data quoted by the commenter for numbers of facilities within waterbody categories that are projected to be impacted by this regulation, the assertion that EPA underestimated the number of facilities projected to belong in the estuary/tidal river category is moot since under the final rule EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. See the Technical Development Document and Economic Analysis for the final rule for an estimate of the number of facilities expected to be in scope of the rule.

Comment ID 316bNFR.524.014

Subject Matter Code	9.3
Documentation of I & E Impacts	

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The following example illustrates why it is sometimes inappropriate to base regulatory decisions on raw impingement and entrainment data only. The Florida Power Corporation ("FPC") Crystal River Power Plant, located in Crystal River, Florida, consists of five units. Four of these units (CR-1, 2, 4, and 5) are coal-fired, and the fifth (CR-3) is nuclear. Units 1, 2, and 3 are collectively known as CR South and have a separate NPDES Permit. In a 1979 NPDES Permit renewal, the EPA asserted that these three units had caused AEI due to entrainment and impingement. FPC contested this assertion and later conducted impingement and entrainment mortality studies in 1984 that appeared to support a finding of no significant adverse impact. However, EPA interpreted the data differently and, in the 1987 renewal of the permit, reasserted its previous determination (of AEI). The Supporting Statement cited an EPA Region IV report that stated that "specific losses" at Crystal River included 23 tons of fish and shellfish annually. However, FPC believed, and continues to believe, that these numbers are inaccurate. The calculations which EPA made to derive the tonnage of losses were based on total entrainment estimates and ignored known survival rate statistics from the 1984 study.

Furthermore, the determination by EPA completely ignored any consideration of the incremental population level impact of entrainment losses on the overall health of regional fisheries. Actually, subsequent entrainment studies conducted at Crystal River indicated a high survival of indicator species. Also, the estimates were never compared with trend data for total commercial take as a basis for determining incremental significance. Finally, there was no consideration of the documented existence of a healthy, balanced, and indigenous population of commercially important species in the local ecosystem, which provided the most definitive evidence that no significant AEI impact was being caused by operation of the Crystal River cooling system.

FPC refuted EPA's findings by citing the entrainment mortality study results and based on the above considerations. However, in ensuing negotiations, FPC agreed to a settlement with EPA that required the implementation of an Environmental Enhancement Program ("EEP"). The EEP included the installation of bar racks and traveling screens, flow minimization practices, salt marsh restoration and the construction of a mariculture center.

In summary, EPA has no sound basis for citing the Crystal River situation as evidence that AEI has occurred due to entrainment and impingement impacts. The settlement reached between FPC and EPA was simply expedient as a method of resolving permit negotiations and never amounted to a concession by FPC that AEI was, in fact, occurring at Crystal River.

In sum, the assumption that a waterbody with many eggs or larvae per cubic foot of water is especially "sensitive" to cooling water intake impacts is an oversimplification. In contrast, the proposed Two Track decision process avoids such overgeneralizations. The simplification that the Two Track approach incorporates (e.g., the preapproval of certain highly protective technologies for the Fast Track) is conservative, and the approach has the flexibility to allow detailed site-specific studies (on

Track 2) when existing information shows that such a study is warranted.

EPA Response

While today's rule does not set out certain water body types as more sensitive than others, it is a well accepted principle that estuaries are highly productive water bodies and that they contain a higher concentration of aquatic life than less productive waters. As a consequence, it is logical to assume that the more water drawn in to a cooling water intake structure from a highly productive water body the greater the number of aquatic organisms subject to impingement and entrainment.

With respect to the comment on the need for a two track process, EPA has adopted such an approach in today's rule and this approach allows for detailed site-specific studies when warranted.

With respect to the comments on the Crystal River facility please see Response to Comment 316bNFR.068.410. For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.524.015

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Littoral Zone

In Part II.D.2 of the NODA, EPA asks about its conception of the "littoral zone." EPA suggests changing "littoral zone" to another term such as "area of potential high impact" or "productivity zone." Or EPA might define areas with greater potential for adverse impacts on a waterbody-specific basis (66 Fed. Reg. 28,858 col. 1); in particular, EPA says it might continue to define a sensitive area in oceans as the "photic zone of the neritic region." 66 Fed. Reg. 28,858 col. 1.

As UWAG said in its November 2000 Comments, use of the "littoral zone" raises a host of problems, one of which is that it imposes a simplistic "zoning" concept as a means of dealing with an issue that depends not just on spatial area but on hydrology, species and life-stage of fish present, and reproductive strategies of those fish.

UWAG acknowledges that protecting areas that are truly sensitive to entrainment and impingement impacts is an appropriate regulatory objective. UWAG certainly agrees that location has an effect on environmental impact. But EPA's "littoral zone" is not a reliable surrogate for sensitivity. A more practical and biologically defensible means of regulating CWISs would give permittees the option of using highly protective technologies that will be protective in virtually any location (as in the Fast Track of the Two Track approach), or examining more closely site-specific factors that make a site sensitive or nonsensitive (as in Track 2). But attempting to define the sensitive area generically will notwork, whether that effort focuses on the "littoral zone" or some even vaguer "area of potential high impact" or "productivity zone," neither of which EPA defines.

DOE, in its recent comments on the NODA, encourages EPA to define areas of impact on a waterbody-specific basis. DOE says that AEI is clearly a site-specific phenomenon and should be separately evaluated and mitigated on a case-by-case basis.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.524.016

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

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Revised Definition of Estuary and Ocean

EPA, in Part II.D.3, asks for comment on a revised definition of estuary as follows: "Estuary means all or part of the mouth of a river or stream or other body of water having an unimpaired natural connection with open oceans and within which the sea water is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass)." 66 Fed. Reg. 28,858 col. 1. EPA also requests comment on a revised definition of "ocean": "Ocean means marine waters seaward of the mean low tide mark or seaward of the waters defined as estuary waters." 66 Fed. Reg. 28,858 col. 1. UWAG notes that EPA's previously proposed definition of estuary included a fixed 30 parts per thousand value demarcating estuaries from oceans. In UWAG's November 2000 Comments, we pointed out that the 30 part per thousand salinity concentration was not appropriate for all waterbodies. UWAG November 2000 Comments, pp. 90-92. However, simply leaving the seaward edge of an estuary to the judgment of permit writers (and thus inviting inconsistent decisions) is not entirely satisfactory, either. As UWAG already suggested, the Venice system, which separates brackish waters into five zones (mixohaline, oligohaline, mesohaline, polyhaline, and euhaline), would provide a more comprehensive ecosystem approach, one which focuses on the precise categorization of the habitat roles of the zones in the life cycles of anadromous species.

In any event, the proposed Two Track approach avoids the need for a detailed definition of "ocean" or "estuary." The Fast Track technologies are protective enough to avoid AEI in virtually any ocean or estuarine environment. In cases where the owner/operator does not choose the Fast Track option, a more detailed investigation of site conditions is called for, again avoiding the need for a legalistic definition of "ocean" or "estuary."

DOE does not agree with EPA's proposed definition of "estuary" that includes a salinity limit of greater than 0.5 ppm. See DOE NODA Comments. DOE points out, in its recent comments on the NODA, that in most estuaries the salinity fluctuates notably throughout the year. EPA's proposed definition could cause a facility to be placed in more than one subcategory of requirements.

EPA Response

In the final rule the definitions for estuary and ocean are as follows:

Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

However, as the commenter also observes, since EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types their discreet differences are less important with respect to meeting the requirements of Section 125.84.

Comment ID 316bNFR.524.017

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Subject Matter Code 12.22

Potential for Additional Measures for Unique Situations (Great Lakes)

Great Lakes

In Part II.D.4 of the NODA, EPA asks whether the Great Lakes should be protected to a greater extent than other lakes and reservoirs, based on the information in three documents. UWAG agrees that the Great Lakes are different from other lakes, although that does not necessarily mean that they are more "sensitive." Again, for the reasons noted above, the Two Track approach avoids the need to make narrow, legalistic distinctions between different types of waters.

The Great Lakes have their own community of fish and other aquatic organisms, but these are not "unique" in any biological sense. The Great Lakes are, in fact, unusual in only two respects relevant to § 316(b). First, because they are so large in volume, a screening criterion that allows a plant to withdraw, for example, 5% of the volume of a waterbody might not be appropriate for the Great Lakes. Second, because of their size, the Great Lakes have more than one facility withdrawing water from some areas, raising the issue of "cumulative impacts." In a biological sense, however, there is no reason to consider the Great Lakes fisheries "unique."

As UWAG stated in its November 2000 Comments, there is no biological basis for applying more stringent § 316(b) regulations to facilities located on the Great Lakes. UWAG November 2000 Comments, pp. 266-68. The Great Lakes exhibit vertical zonation typical of smaller lakes. Because of their large size and depth, the fish communities differ from smaller lakes. UWAG November 2000 Comments, p. 267, citing Becker 1983. However, these communities are not more sensitive than those found in other lakes. To the contrary, the communities in the Great Lakes are probably less sensitive, because of the large volume of water in which potentially vulnerable life stages are dispersed.

Moreover, the fisheries of the Great Lakes are closely monitored and controlled. Any new cooling water intakes proposed for the Great Lakes would be scrutinized carefully by state regulators, and any potential problems could be addressed through the permitting process.

The documents that EPA proffers to support its thesis "that the Great Lakes are a unique system that may deserve additional protection from the impact of cooling water intake structures" in fact do not support that thesis. The Herdendorf article (DCN#: 2-016A) discusses the geomorphology and physiography of the Great Lakes, and whether certain areas of the Lakes (such as drowned river mouths) should be classified as lacustrine estuaries. The author does not argue that all areas within the Great Lakes are highly productive and highly sensitive. The Nature Conservancy report (DCN#: 2-016B) lists 11 human activities that are the primary stresses on the Great Lakes, and none of these are related to CWIS operations.<fn9>. And the focus of DCN#: 2-016C, EPA's Supplementary Information Document for the Great Lakes Water Quality Guidance ("SID"), is water quality, not stresses on fisheries.<fn10>

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.524.018

Subject Matter Code	10.011
	River/Stream--Proposed Standards

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Freshwater Rivers and Streams

In Part II.D.5 of the NODA, EPA asks whether the aquatic species predominant in freshwater rivers and streams have reproductive and life history strategies that make them less susceptible to CWISs. 66 Fed. Reg. 28,858 col. 3. Possible bases for distinguishing freshwater fish is that (1) they contain fewer species that exhibit planktonic (free-floating) egg-and-larval-dispersal behaviors that may expose early life stages to impact from CWISs, and (2) they are not harvested commercially as extensively as marine fish, and management practices for marine fish are slow to respond to over-exploitation. EPA cites six documents for comment and asks whether they support a modified set of requirements for freshwater streams and rivers. The modified rule would (1) eliminate the proposed requirement to reduce impact capacity to a level commensurate with closed-cycle cooling located inside or within 50 meters of the littoral zone, and (2) require additional design and construction technologies in all parts of freshwater rivers and streams rather than only in the littoral zone. Even the modified approach would keep the requirements for a design intake flow of <= 5% of the source water mean annual flow and <= 25% of the source water 7Q10 low flow, as well as a design intake velocity of <= 0.5 ft/s in all parts of freshwater rivers and streams. While the NODA does not discuss how the "additional design and construction technologies" would be determined, it is not unreasonable to assume that those technologies would have to be determined on a site-specific basis, given that the technical feasibility and performance of such technologies is widely acknowledged to be very site-specific.

In its recent comments on the NODA, DOE encourages EPA to offer regulatory alternatives not just for freshwater rivers and streams but for all waterbodies, if the facilities can demonstrate that they do not cause AEI.

UWAG agrees that freshwater streams and rivers are relatively insensitive to entrainment and impingement impacts in many cases and, therefore, believes that EPA's original proposal was more restrictive than necessary. The alternative Two Track approach avoids the need to make fine distinctions between sensitive and insensitive waters by allowing the permittee to choose between installing highly protective technology that will protect the fish at virtually any site or, alternatively, pursuing a more tailored site-specific approach that would identify in each case whether a waterbody was sensitive or insensitive and what portions of it might be the most sensitive.

Relying solely on the site-specific studies to determine local needs for new facilities may be expensive and time-consuming, and requiring such studies in every case will create costly delays and strain the resources of agency permit writers. The Two Track approach offers the best of both worlds, in that it allows streamlined licensing (where the applicant is willing to commit to highly and usually overly protective technology) but also permits a more careful assessment of site needs (in other cases).

If nothing else, the realization that some waters (many freshwater rivers and streams, for example) are less sensitive than others to entrainment and impingement impacts should make it clear that an across-the-board requirement of wet closed-cycle cooling (much less dry cooling, which EPA says it is still considering) is not justified. But while eliminating across-the-board requirements for closed-cycle cooling for freshwaters – and indeed for other waters – makes sense and likely would result in capital, O&M, and energy savings in many cases, it still imposes rigid velocity and flow restrictions that may arbitrarily foreclose some new facilities, and the studies required could create costly uncertainty and delay for all new facilities. The Two Track approach avoids this problem. Developers of new facilities would have the same option to explore alternatives to closed-cycle cooling, without facing arbitrary permitting flow and velocity requirements that could foreclose the use of other appropriate CWIS technologies.

EPA Response

EPA has reviewed the literature to determine whether the data would support a modified set of requirements for freshwater streams and rivers based on the theory that the species predominant in these waterbodies are less susceptible to impacts from CWISs. EPA acknowledges that due to site-specific conditions some waterbodies may be less susceptible to impingement and entrainment than others. However, for purposes of developing a national regulation EPA has moved away from a location-based framework. See 316bNFR502.002 and the preamble to the final rule. In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards, for all waterbody types, that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow.

In the final rule EPA does not require “across-the-board” use of wet closed-cycle cooling as stated by the commenter. Under the two-track technology-based approach new facilities will have the option to explore alternatives to a closed-cycle recirculating system as long as the requirements of Section 125.84 are met.

Comment ID 316bNFR.524.019

Subject Matter Code	11.0
Best Technology Available-Location	

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Exception for Waters Not Designated for Aquatic Life

In Part II.D.6 of the NODA, 66 Fed. Reg. 28,859 col. 1, EPA, while recognizing that the waters affected would be few in number, asks whether less costly technologies may be acceptable in waterbodies having no designated use for the support of propagation or maintenance of aquatic life. EPA asks for comment on other ways of identifying or defining waters with low susceptibility to impact from CWISs because they would not support much aquatic life even without a CWIS. 66 Fed. Reg.
28,859 col. 1.

UWAG agrees that waterbodies not designated for protection of aquatic life should be exempted from the regulation. There are not very many sites that would qualify for this exemption, as EPA points out in the NODA, but, for those few sites, it would be senseless to require expensive technology to protect fish that do not exist.

It may be objected that such an exemption will "write off" such waters and condemn them to a degraded state forever, even if there is hope that the water quality may improve in the future. But there is no need to solve this problem through the § 316(b) rule. EPA's regulations already provide the states a way to upgrade the uses of their waters. If a state wishes to upgrade the use of a water that is not now designated for fish and wildlife, it can do so, and thereby bring the water within the reach of the § 316(b) rule at the same time. The more relevant question in most cases will be whether the waterbody has recovered to the extent that it can support organisms vulnerable to impingement and entrainment. Track 2 technologies, such as Ecological Risk Assessment, can be adapted to address these questions using available information.

EPA Response

The final rule adopts a different approach. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types, including "waterbodies not designated to support an aquatic life use." Thus, today's final rule does not establish less stringent requirements for waterbodies not designated to support aquatic life use. However, to the extent that the lack of an aquatic life use would result in Track I requirements achieving limited reductions in impingement and

entrainment at a site, a permit applicant willing to conduct site-specific studies under Track II might be able to demonstrate that alternative technologies or approaches would reduce the level of impingement and entrainment as Track I at that location.

Comment ID 316bNFR.524.020

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

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Impingement, Entrainment, and Mortality Data

In Part II.E.1 of the NODA, EPA raises the question whether AEI ought to be defined in terms of population- and community-level impact while acknowledging that some stakeholders have questioned possible alternatives, claiming the alternatives essentially would define AEI as any detectable impact ("one dead fish," in the parlance). The answer is that only population- and community-level impacts are meaningful in a biological sense, except in the case of threatened or endangered species. A decision to regulate any impact at all ("one dead fish") would be a purely social judgment, not a biological one. Population level is the lowest meaningful level of ecological organization, and the lowest level at which impacts should be assessed if the assessment is to be driven by ecological principles rather than ideology.

Moreover, as UWAG has said in the past, a mere counting of lost fish is not meaningful in the sense of measuring "environmental impact." It is not meaningful for at least two reasons. First, the number of fish lost does not tell us whether there has been serious harm to the structure and functioning of the ecosystem. Population- and community-level impacts can, on the other hand, tell us this. Second, because natural aquatic populations compensate for losses, the loss of a number of fish will be partly or wholly made up by increase in fecundity or survival. Hence, a mere accounting of fish lost cannot in any biological sense be dispositive, or even meaningful in many cases.

DOE points out that an assessment of AEI should take into account that many species of aquatic animals survive impingement quite well and that even some entrained organisms survive. See DOE NODA Comments. Moreover, even those organisms that die or are critically injured by impingment or entrainment do not necessarily constitute AEI, because they may provide food for other animals. And even if it is assumed that all impinged and entrained organisms are removed from the ecosystem, it is important, DOE asserts, to assess the loss of the organisms not strictly as a loss, but rather in relationship to the overall population of organisms in the waterbody and other anthropogenic or natural causes of injury and mortality. The assessment also should consider the ability of the population to compensate for and make up the lost organisms through natural reproductive strategies.

UWAG has said that, in making a § 316(b) regulation, EPA should use the principles of fisheries management science that have been developed over many years of experience. UWAG November 2000 Comments, p. 66. Fishery managers are familiar with the practice of calculating target fishing harvests consistent with sustaining reproduction and growth of fish stocks. To optimize yield, managers often strive to allow fishing at levels close to "Maximum Sustainable Yield" ("MSY"), expressed, for example, in tons per year. FMSY is the maximum amount of fishing mortality that a fish stock can sustain year after year, after accounting for mortality from other causes, which implicitly include population and CWIS effects. Target Fishing Mortality Rates (FTARGET) set in fishery management plans today typically have some allowance for safety. These rates are adjusted as

circumstances require and may be set at levels substantially below FMSY where stock recovery from past over-fishing is required.

One useful approach to determining whether there is likely to be AEI is to calculate, by use of a model, the number (or pounds) of equivalent adult fish that will be lost because of entrainment and impingement by a CWIS. If the size of the projected loss each year is a small enough fraction of the fisheries management target, then it should not be considered to be AEI. Other means of assessing AEI are equally valid, as described in the next section.

EPA also invites commenters to supply “additional studies that document either significant impacts or lack of significant impacts from cooling water intake structures.” 66 Fed. Reg. 28,859 col. 3. Due to the very short comment period, UWAG was not able to collect and analyze the numerous studies which demonstrate lack of significant impacts from CWISs, but we have submitted three such studies. (Energy Impact Associates, 1978, 1980; NUS Corporation, 1982).

EPA Response

Please see responses to comments 316bNFR.507.004 (AEI interpretation/population-level assessments), 316bNFR068.015 (compensation), 316bNFR.501.015 (entrainment/impingement mortality), and 316bNFR.068.037 (MSY).

EPA reviewed each of the studies submitted by the commenter. Both studies conclude that cooling water withdrawals result in limited adverse environmental impacts. EPA offers the following comments pertaining to these studies.

Studies conducted at the R. Paul Smith Power Station (located on the east bank of the Potomac River in Williamsport, Maryland) primarily focused on evaluating impacts from thermal discharges (Energy Impact Associates 1978, revised 1980). The report documents some of the anthropogenic disturbances that have historically impacted this segment of the Potomac, including acid mine drainage, agricultural and industrial discharges, and increased siltation that have had "a considerable effect on the aquatic biota of the river" leaving some upstream regions "devoid of fish" while downstream segments support a "declining game fish community as rough and forage fish increase." Entrainment studies were conducted during the spring and summer of 1978; impingement surveys were conducted from September 1977 to September 1978. Results of the studies indicated very low numbers of impinged or entrained representative important species

Impingement and entrainment studies at the Mitchell Power Station (located on the west bank of the Monongahela River near Courtney, Pennsylvania) were conducted over a one-year period (NUS 1982). Similar to the R. Paul Smith Power Station, the Mitchell Power report documents heavy mining and industrial activities along the Monongahela River that "all but eliminated fish life from the river in the early 20th century." According to the report, fish collections from the Monongahela conducted in the late 1950s produced a single specimen. The report indicates that gradual water quality improvements are occurring, especially in the upper drainage portions of the river.

EPA is concerned that the relatively short timeframe under which these studies were conducted may

inadequately capture the natural variability associated with many aquatic organisms. As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations (please see response to comment 316bNFR.507.004). Further, EPA questions the relevance of these reports and others submitted to the record asserting low numbers of entrained or impinged organisms within waterbodies that are degraded at the time of the study (please see response to comment 316bNFR.501.015). Impaired waterbodies or waterbody segments often exhibit diminished numbers and diversity of organisms. As discussed in preamble section VI.B.3, EPA is concerned that cooling water intakes may be contributing additional stress to impaired waterbodies and their biota.

Comment ID 316bNFR.524.021

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

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Population Modeling

EPA seeks comments on UWAG's suggested definition of AEI <fn11> and methods of implementing that definition, stating "[u]nder this approach, EPA would define unacceptable risk using a variety of methods that fisheries scientists have developed for estimating (1) the level of mortality that can be imposed on a fish population without threatening its capacity to provide "maximum sustainable yield" . . . and (2) the optimum population size for maintaining maximum sustainable yield." 66 Fed. Reg. 28,859- 60. DOE's opinion is that AEI must be assessed in terms of impacts to populations rather than on the loss of a certain number of individuals. DOE supports the proposed definition of AEI as based on good science, with certain caveats. DOE urges caution in using tools such as "maximum sustainable yield" as rigid, enforceable regulatory limits. The models are predictive, DOE says, and therefore subject to error. Using as a criterion for determining AEI a 1% reduction in fish population size, for example, would not be appropriate in DOE's opinion; given the huge natural fluctuations in fish populations, a criterion of 1% reduction could not be confidently measured or predicted, even by maximum sustainable yield models. Although DOE favors explicitly measured regulatory criteria, it recommends flexibility if the ability to measure or predict is highly uncertain. In DOE's view, maximum sustainable yield models should be used as one of several tools to help regulators determine whether a cooling water intake is causing AEI, but not with a "bright line" criterion of 1% reduction.

To clarify UWAG's position, there are many workable methods for implementing § 316(b) decisions based on a definition of AEI that focuses on population level effects. Fisheries management calculations, such as MSY (which have no regulatory effect), are one possible means of assessing the risk of AEI. Other means include use of population-based models. (EPRI 1999.) Depending on the types of potential impacts, the ecological function of the species potentially affected, competing uses of the fishery, and the availability of data, various assessment techniques may be preferable in a given situation.

EPA is considering using a population modeling approach to define AEI. 66 Fed. Reg. 28,860 col. 1. EPA asks whether it is possible to use such models, which historically have been used to perform single species assessments, to assess impacts on multiple species instead. Id. Population modeling is typically performed on a species-by-species basis. However, many facilities have modeled population impacts for multiple species, and their results have been accepted by regulators. While UWAG would not rule out the possibility of development of a cross-species modeling method, it is not state-of-the-art at this time. As with many other aspects of the rule, however, EPA should design the rule to be adaptable to innovative modeling techniques.

EPA states that it "intends to evaluate" the use of population models for multiple species, but provides none of its analysis. 66 Fed. Reg. 28,860 col. 1. Instead, EPA enters into the record 67 documents (or pieces of documents) related to the subjects of population modeling, fish stock assessment, and

compensation. Given the very short time period for commenting, as well as EPA's failure to provide anything other than the cover pages and table of contents for some of the documents, UWAG has not had an adequate notice or opportunity to comment on EPA's literature collection. Even more significantly, since EPA has not analyzed its own record and presented its conclusions, it cannot expect UWAG and the other commenters to divine them from a mass of documents. While UWAG generally supports modeling at the population level, until EPA divulges its approach to population modeling, interested stakeholders can only speculate as to the Agency's intention.

EPA Response

Please see responses to comments 316bNFR510.006 and 316bNFR.068.037.

At proposal EPA considered defining AEI as "the impingement or entrainment of one percent or more of the aquatic organisms in the nearfield area as determined in a 1-year study." However, today's rule does not interpret AEI in this fashion.

Comment ID 316bNFR.524.022

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

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Compensation

EPA also requests comment on a brief e-mail correspondence from Douglas Vaughan (DCN#: 2-020C) that states that the use of compensation factors is typically limited to cases where fishery managers have extensive data on a fish population and that specific numerical compensation values generally are not used in the absence of a robust data set with a minimum of 15-20 years of data. 66 Fed. Reg. 28,860 col. 1. As part of its November 2000 Comments, UWAG supplied a significant new scientific work on compensation in fish. See Appendix B to UWAG November 2000 Comments. As described in that appendix, new methods of estimating compensatory reserves and new databases compiling large amounts of fisheries data are being developed. Indeed, the author of UWAG's Appendix B, Professor Ransom A. Myers of Dalhousie University, has estimated compensatory reserves for 246 species. Furthermore, Professor Myers explains in the appendix that meta-analysis (i.e., the process of combining and assessing findings from several separate research studies that bear upon a common scientific problem) has "become a standard approach used to evaluate the critical population parameters needed to understand fisheries dynamics." Appendix B, UWAG November 2000 Comments, p. 31. With the continuing compilation of very large fishery datasets, meta-analysis methods will greatly increase the number of species for which scientists will be able to estimate compensatory reserves.

DCN#: 2-020C (the Vaughan e-mail correspondence) appears to describe accepted National Marine Fisheries Service ("NMFS") methods for estimating fish stocks and whether and how those methods take compensation into consideration. It does not purport to be a scientific work of the nature and scale of Professor Myers' appendix. Moreover, while the e-mail does not address the use of meta-analysis to develop estimates of compensatory reserve, it indicates that NMFS "widely uses" proxies "to side-step the need for quantitatively determining compensation." This simply reflects the reality that scientific research-data gaps are not always filled as quickly as one would like.

But with the advent of meta-analysis methods and the large amounts of new data regarding fisheries currently being collected, it is clear that many more and better estimates of compensatory reserves (including estimates for non-harvested species) <fn12> will be developed in the near future, and certainly by the end of this decade. EPA's rule should take this trend into consideration. It should do so by endorsing the use of population models that take account of compensation, where adequate data exist to justify their use.

EPA Response

Please see responses to comments 316bNFR.068.015 and 316bNFR.068.014.

EPA strongly supports additional research efforts and expansion of existing fishery datasets to improve our understanding of the complex relationships associated with aquatic ecosystems and anthropogenic influences.

Comment ID 316bNFR.524.023

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

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Biological Assessment Approach

In Part II.E.3 of the NODA, EPA addresses biological assessments and invites comments on using biological assessments and biocriteria to assess AEI. EPA says that biological assessment and criteria methods are still being developed; that most work to date by the states to use these methods has been applied to small streams and wadable rivers where there are few CWISs; that, where there are multiple stressors, it is not well understood how to identify the different stressors and how best to apportion the relative contribution to the biological impairment from each source within a watershed; and that the application of ecological risk assessment methods to CWISs has not been tested. 66 Fed. Reg. 28,860-61.

UWAG shares EPA's concerns about certain limitations of biocriteria as applied to § 316(b) determinations in many cases. As stated in our November 2000 Comments, UWAG questions the use of biocriteria to access sites for new facilities. In some states currently using biocriteria as part of their water quality programs, the metrics used to establish the criteria (e.g., relative abundances of forage vs. predator fish or of different taxonomic groups of benthic invertebrates) have not been developed for purposes of evaluating CWIS impacts, and are ill-suited to that function. While it may be possible to develop finely-tuned metrics that would focus on typical CWIS impairments, it is difficult, at least for new facilities, to envision how these metrics would be used for proper assessment of the potential impact, and how they would be sufficient for distinguishing between different types of stressors to fish communities. However, in circumstances where there is a long-term database and well-developed metrics such as TVA's Reservoir Fish Assembly Index, biocriteria can be appropriate for § 316(b) decisionmaking.

EPA cites an EPRI document, stating: that biocriteria are well suited for assessing community-level effects but are not designed as indices to measure population-level effects without additional analyses; that assumptions about the structure and function of ecosystems embedded in the biocriteria approach appear to conflict with the current understanding of ecosystems as dynamic, nonequilibrium systems structured on multiple time and space scales; and that issues such as significant uncertainty in reference conditions due to unaddressed sources of natural variability among reference cites may be of particular importance for large, open systems such as estuaries and coastal marine waters. 66 Fed. Reg. 28,860-61. UWAG generally endorses these points.

Finally, EPA asks for comment on eight additional documents, most of them EPA guidance on biological criteria and bioassessments methods. 66 Fed. Reg. 28,861 col. 1. UWAG doubts the efficacy of EPA's Stressor Identification Guidance (DCN#: 2-022F) for assessing the potential impact of planned CWISs. It is unclear how EPA would assess potential stressors, such as new CWISs, as opposed to existing stressors. Further, the Guidance claims that only a "medium" level of rigor is required for identifying stressors related to § 316(b) determinations. Guidance, p. ES-3. Based on the

collective experience of the UWAG members, we disagree that distinguishing among potential sources of § 316(b) impacts is necessarily a “medium” level of effort. As we have continuously emphasized, § 316(b) assessments are highly site-specific. In some locations, it may be very easy to assess potential stressors, due to their location and type of impact relative to other stressors. In other locations, the task may be very difficult indeed.

EPA Response

Biological assessments and criteria are recognized as important methods for gathering relevant ecological data for addressing attainment of biological integrity and designated aquatic life uses. EPA identified potential constraints on using these methods to determine adverse environmental impact from the operation of cooling water intake structures. First, biological assessment and criteria methods are still being developed for large rivers and the Great Lakes, two large waterbody types where many cooling water intake structures are located. Second, although biological assessment and criteria guidance has been published by EPA for small streams and wadeable rivers, lakes and reservoirs, and estuaries and coastal marine waters, many States and authorized Tribes have yet to apply these criteria in large waterbodies where cooling water intake structures will be located. Most work to date by the States to use these methods was applied to small streams and wadeable rivers where relatively few cooling water intake structures are located. In addition, although bioassessments and criteria are valuable for evaluating the biological condition of a waterbody, in complex situations where multiple stressors are present (e.g., point source discharges, non-point source discharges, harvesting, runoff, hydromodifications, habitat loss, cooling water intake structures, etc.), it is not well understood how to identify all the different stressors affecting the biology in a waterbody and how best to apportion the relative contribution to the biological impairment of the stressors from each source within a watershed. Thus, it is the opinion of EPA that the existing guidance for conducting biological assessments
(particularly within large river systems and the Great Lakes) and the quantity of biocriteria data compiled at the State/Tribal level are insufficient at this time to apply a biocriteria approach to evaluation of cooling water intakes nationally. Also, please see response to comment 316bNFR.511.015.

Comment ID 316bNFR.524.024

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Subject Matter Code 11.0

Best Technology Available-Location

Nearness to Impaired Waters

EPA first asks for comment on an Agency-generated table listing 571 cooling water intakes and identifying intakes located within 0.5 miles, 1 mile, and 2 miles of waterbodies identified by the affected states as being "impaired" (DCN#: 2-023).<fn13> 66 Fed. Reg. 28,861 col. 2. These data are relevant to § 316(b) only if the cause of the impairment is identified as operation of a CWIS. Without examining the reason each waterbody segment was listed as impaired, there is little or no reason to think that the impairment had anything to do with cooling water withdrawals. In fact, only 35% of the structures identified by EPA were located within two miles of an impaired waterbody.

UWAG has investigated several of the utility facilities that EPA lists as within two miles of an impaired water; therefore, we can document that the impairments are unrelated to CWIS operations. For example, Millstone Station is located on Niantic Bay, which Connecticut has listed as impaired based on a closure to recreational shellfishing.<fn14> The suspected causes of the impairment are "bacteria, urban runoff, on-site domestic septic systems, recreational activities." Id. Millstone's CWIS has no relation to these causes of impairment. Id.

Niantic Bay is an extension of Long Island Sound, which is also a listed waterbody. Millstone Station, however, is not a cause of impairment for Long Island Sound, either. The Sound is listed as impaired on the basis of nutrient enrichment; low dissolved oxygen; toxic contamination in fish, waterfowl, and sediments; pathogen contamination; floatable debris; aquatic life support; and aquatic habitat disturbance. Suspected causes of these impairments include historic disposal of dredged material, combined sewer overflows, stormwater discharges, loss of habitat, and habitat degradation. Id.

As for nutrient enrichment, the state is focusing on reducing nitrogen loadings, and there is no indication that the facility's CWIS operations have any effect on nitrogen loadings. Millstone's CWIS cannot be bringing nutrient-rich bottom waters to the surface, because there is no significant oxygen or temperature stratification in Niantic Bay due to strong tidal action. Thus, it is clear that Millstone's CWIS is not causing impairment of Niantic Bay or contributing to the extensive impairments of Long Island Sound.

Dickerson Station, also listed as within two miles of an impaired water, is located on the Potomac River. Maryland placed the Potomac River (Upper, Middle, and Lower Tributary segments) on its § 303(d) list because of excess nutrient loadings to the Chesapeake Bay. Maryland's list indicates that non-point, natural, and point sources contribute nutrients to the Potomac.<fn15> However, to our knowledge, there has never been a local impairment problem in the vicinity of Dickerson Station, and operation of the CWIS does not cause nutrient loading to the Potomac. Additionally, any water turbulence attributable to the CWIS is not contributing to the movement of nutrient-rich deeper waters to the surface because there is strong, naturally-occurring vertical mixing in the Potomac at the

Station's location.

Calvert Cliffs, a nuclear power plant located on the Chesapeake Bay, also is designated by EPA as within two miles of an impaired water. The applicable segment of the Chesapeake is listed as impaired for suspended sediments and nutrients. The § 303(d) list notes that non-point and natural sources are the cause of the impairment. Id. Therefore, state regulators clearly do not consider Calvert Cliffs' CWIS a source of the impairment.

Brown's Ferry Nuclear Station, located on the Wheeler Reservoir of the Tennessee River, also is listed as within two miles of an impaired water. Our research, however, indicates that the nearest impaired waterbody segment is ten miles downstream of the Station. That segment is impaired for pH and temperature/thermal modification, parameters unrelated to CWIS operation.

EPA Response

EPA recognizes that the data prepared internally by Dabolt, ("Relationship of Location to Cooling Water Intake Structures to Impaired Waters, Memorandum, April 2001) does not establish that cooling water intake structures are the cause of adverse environmental impact in any particular case, and that there may be other reasons for the presence of impaired waters near cooling water intake structures. Nonetheless, this analysis suggests that many cooling water intake structures are sited within or adjacent to impaired waters, and that intakes may contribute to existing stress on waterbodies and their resident biota.

Comment ID 316bNFR.524.025

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Subject Matter Code 10.04

Site-specific Permit Flexibility

Fisheries Studies That Say Little or Nothing About Intake Structures

UWAG's review of the documents EPA lists in Part II.E.4 of the NODA has revealed that they do not support EPA's contention that "impingement and entrainment in combination with other factors may be a non-trivial stress on the waterbody." 66 Fed. Reg. 28,861 col. 1. DCN#: 2-024A is a policy statement from the American Fisheries Society ("AFS") supporting reauthorization of the Endangered Species Act. The statement notes that one-third of all native North American fish are endangered, threatened, or of special concern and that the number of species assigned to each of these categories is increasing. According to the AFS, this situation reflects a progressive deterioration of North American aquatic ecosystems. The statement, however, does not mention cooling water withdrawals as a contributor to this deterioration. Instead, it identifies habitat degradation, introduction of non-native species, and overfishing as the "major causes of aquatic species endangerment."

EPA also asks for comments on information indicating overutilization of about 46% of the fishery stocks of known status tracked by and under NOAA purview (73 out of 158 stock groups) and which rely on tidal rivers, estuaries, and oceans for spawning, nursery, or adult habitat. 66 Fed. Reg. 28,861 col. 2. EPA says it believes that stress due to overutilization may be relevant to assessing cumulative impacts of multiple stressors. EPA requests comment on 15 documents regarding the definition of AEI and concerns associated with assessing multiple stressors. 66 Fed. Reg. 28,861-62. UWAG does not believe that EPA's record substantiates AEI due to multiple CWIS stressors.

DCN#: 2-024C and D, for example, discuss "bycatch," i.e., fish caught and discarded by commercial fishermen. These documents identify bycatch as important from a socioeconomic perspective (waste of valuable resources) and from an ecological perspective (potential impacts on certain species). But the relevance of bycatch to § 316(b) is limited because, at least in North America, management concerns related to the ecological effects of bycatch are limited primarily to the shrimping industry in the southeastern U.S. and to a relatively small number of vulnerable species (for example, red snapper, weakfish, Atlantic croaker, and Atlantic menhaden). One of the cited documents (DCN#: 2-024D) discusses ways in which the economics of fishing and fishing management strategies act to increase bycatch. These processes clearly do not apply to CWISs.

DCN#: 2-024F through DCN#: 2-024I describe methods for assessing combined impacts of fishing and pollutants on fish populations. They show that, in theory, pollutants can exacerbate the impacts of fishing on the dynamics of fish populations. However, all of the papers are strictly theoretical explorations. None includes any data or analyses evaluating actual interactions between pollutants and fishing or discusses any known cases in which such interactions have been shown to be important.

DCN#: 2-024B, J, and K are reviews of definitions of "overfishing" incorporated into Federal fishery management plans. The reviews were performed to ensure that those definitions are scientifically

appropriate and adequate to protect and conserve fishery resources. They do not identify any specific stressors, other than fishing itself, that might affect fish populations.

DCN#: 2-020A states that a substantial fraction of marine fish stocks inhabiting the U.S. Exclusive Economic Zone (all marine waters within 200 miles of the U.S. or U.S. overseas territories) are believed to be "overutilized," i.e., reduced in abundance by overfishing to levels lower than the levels that theoretically would produce a maximum sustained yield. No information on causes, other than fishing, that might contribute to these conditions is provided.

DCN#: 2-024E and L describe the "precautionary approach" to fishery management. The precautionary approach is a management philosophy that emphasizes maintaining the long-term sustainability of biological resources rather than maximizing the short-term utilization of them. Under the precautionary approach, fishery managers are expected to take actions that ensure that fish stocks will not be affected adversely by overfishing, rather than taking action only after overfishing already has been demonstrated. The precautionary approach also emphasizes explicit consideration of uncertainty when fishing regulations are established, so that more restrictive regulations are implemented when uncertainty is high. Neither paper discusses interactions between fishing and other stressors.

The only documents that specifically mention CWISs are DCN#: 2-024M through 2-024O and 2-018A. DCN#: 2-024M through 2-024O are modifications to federal fishery management plans intended to identify potential threats to "essential fish habitat." In addition to CWISs, these plans discuss a wide variety of "non-fishing impacts" on fish populations, including dredging, dredge spoil disposal, oil/gas exploration and production, thermal discharges, aquaculture, wastewater discharges, hazardous substance releases, wetlands destruction, and coastal development. The plans recommend that each of these impacts be minimized wherever possible but provide no guidance on their relative importance or on any particular triggers for management action.

DCN#: 2-018A discusses the concept of "surplus production" as it relates to entrainment and impingement mortality and argues that entrainment and impingement can have indirect effects on critical ecosystem functions as well as direct effects on the dynamics of individual populations. No data are presented and no studies that document the actual occurrence of any such effects are cited.

Although EPA notes that several NOAA fishery management plans cite once-through CWISs as a cause of AEI (66 Fed. Reg. 28,861 col. 3), from our review of the supporting documents, NOAA has not substantiated that claim. Of the documents EPA has put on the record, only NOAA's fishery management plan for Atlantic mackeral, squid, and butterfish provides a reference for its allegations about CWISs, and that reference (Hill 1996) deals with hydropower facilities only – not CWISs at steam electric facilities. Furthermore, since the Atlantic States Marine Fisheries Commission ("ASFMC") has launched an initiative to examine the cumulative impacts of CWIS operation on commercial stocks, any determination by NOAA regarding effects of CWISs is inadequate or, at best, preliminary. Results of ASFMC's work are not expected before the end of 2002. UWAG submits that EPA's record does not support the contention that NOAA has made a definitive judgment that once-through CWISs cause AEI. At best, NOAA's statements are unsupported assertions.

EPA Response

EPA does not agree that the record for today's rule contains unsupported assertions pertaining to aquatic resource impacts. EPA believes that today's record substantially documents that aquatic organisms (including protected species, forage species, and commercially/recreationally important fisheries) within our nation's waterbodies are at risk. EPA believes that the record reflects the shortcomings and uncertainties associated with managing fisheries; potential for cumulative impacts to aquatic resources (from either multiple intakes and/or multiple stressors such as eutrophication, toxics loadings, and hypoxia); and potential state of collapse of many coastal ecosystems, all of which clearly indicate that precautionary measures are needed to ensure the sustainability of our aquatic resources. EPA's record also documents that many facilities do entrain and impinge extremely large numbers of fish and shellfish (see section III of today's preamble). Thus, EPA maintains that impingement and entrainment caused by cooling water intakes does constitute an adverse environmental impact.

Comment ID 316bNFR.524.026

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Subject Matter Code 10.16

Two Track Process

Even the most stringent restrictions on CWISs will not restore stocks suffering from overfishing. The regulated community has an obligation to act on a site-specific basis either to employ technologies that avoid AEI at new facilities or to evaluate potentially affected species sufficiently to ensure that, if AEI is occurring, BTA minimizes it. The Two Track approach is designed to accomplish this objective.

EPA Response

See preamble section V for a discussion on the basis for today's final rule. See preamble section VII for a discussion on implementation issues. EPA believes that this rule will help aquatic environments even where there are other stresses. Each regulatory or voluntary program may not in and of itself restore the nation's waters; however, working in concert, these programs have demonstrated an improvement in our environment over what would have existed had they not been in place.

Comment ID 316bNFR.524.027

Author Name	Elizabeth Aldridge, J. Brad Burke & David E. Bailey
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Subject Matter Code 9.3

Documentation of I & E Impacts

Impact Determinations at Specific Power Plants

EPA also invites comment on 24 documents related to environmental impact determinations at specific power plants, namely Diablo Canyon, Moss Landing, Salem, Big Bend, John Sevier, and Crystal River. Most of these studies deal with high-profile cases involving estuaries, and, taken as a collection, are not at all representative of the entire body of § 316(b) determinations. Although EPA cites numerous documents that are, at best, only marginally relevant to the question of whether cooling water withdrawals, in combination with other stressors, are affecting adversely fishery resources, it fails to cite readily available studies that indicate such cumulative effects are not occurring. The most important of these are the many recent studies documenting the status of the Atlantic striped bass.

For example, entrainment and impingement losses of Hudson River and Delaware River striped bass are a matter of public record, and are discussed in DCN#: 2-013A, C, D, E, and F. DCN#: 2-013E summarizes, in addition, data demonstrating the rapid growth of the Hudson River striped bass population throughout the 1980's. This growth occurred in spite of intake-related losses at several Hudson River power plants. Appendices F and H of PSEG's renewal application for Salem Generating Station, which EPA has not included in the docket, summarize data demonstrating the even more rapid growth of the Delaware River striped bass population over the same period. The most recent striped bass stock assessment (Atlantic States Marine Fisheries Commission, 2000 Advisory and Summary Reports on the Status of the Atlantic Striped Bass, available at http://www.asmfc.org/) documents these trends and demonstrates the continued health of this stock.

It is also relevant that the Chesapeake Bay stock of striped bass was greatly depleted in the 1970's. Fifteen years of research on the potential causes of the decline failed to identify any significant contributors other than overfishing (Young-Dubovsky et al. 1995). Neither NMFS nor ASMFC has ever concluded that entrainment or impingement at power plants is significantly affecting Atlantic striped bass.

EPA Response

EPA disagrees with the commenter that the information provided by the Agency regarding cumulative stressors, including cooling water intakes and their affect on fishery resources, is marginally relevant. As EPA has documented, 99 percent of cooling water intakes are located within two miles of waters identified as impaired and needing development of a TMDL. Also, there are few records documenting impingement and entrainment rates at the majority of existing facilities. In most cases updated information was not available, however, to the extent possible, EPA has supplemented the facility information in the record for this final rule to include smaller facilities and updated information.

EPA also disagrees with the commenters implication that aquatic organism mortality related to cooling water intakes is irrelevant because selected fish stocks in some rivers are improving. EPA would note that the information presented for the Hudson River, Delaware River, and Chesapeake Bay can be interpreted to mean that fish populations are improving due to the efforts of other programs such as those which have reduced excess nutrient and toxics loadings, despite the documented continued mortality related to the operation of cooling water intakes. EPA also notes that causation for aquatic organism declines has been particularly difficult to establish in degraded water bodies. This demonstrates the limitations and challenges with conducting biological field studies in degraded water bodies to establish population impacts.

EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. Further, both NMFS and the Atlantic States Marine Fisheries Commission have voiced concerns about the impact of cooling water intakes on fishery resources. For additional discussion of issues raised in this comment please see Response to Comment 316bNFR.056.005, 316bNFR.066.008, and 316bNFR.068.050 as well as sections III and VI.B of the preamble.

Comment ID 316bNFR.524.028

Subject Matter Code	10.04
Site-specific Permit Flexibility	

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As a general matter, UWAG agrees that the impact of a CWIS must be evaluated in the context of the overall health of the waterbody. This will necessarily involve the impact of other stressors. But the size of the effect caused solely by the CWIS, compared to the impacts of other stressors, is relevant both in assessing AEI and, if AEI will occur, in selecting BTA. Thus, it would not be appropriate to hold a CWIS responsible for "AEI" at a site where the dominant cause of impacts was some other stressor or combination of stressors.

One of the most comprehensive, long-term reviews of power plant intake effects has been conducted over the last two decades by the Maryland Power Plant Research Program ("MD-PPRP"). The PPRP has studied entrainment and impingement impacts at 12 major power plants and has concluded that "while operations of individual power plants impact various ecosystem elements in various ways, those impacts, taken together, have had no identifiable substantive cumulative impact on Maryland's aquatic resources to date. Although large entrainment losses of some types of aquatic organisms have been measured frequently, no consistent depletions in numbers of organisms have been found, or the loss is being mitigated." MD-PPRP 1999.

EPA Response

EPA does not agree that it is inappropriate to hold a CWIS responsible for minimizing "adverse environmental impacts" related to cooling water intake withdrawals, even where there are other stressors in the waterbody. This is no different than requiring point source dischargers to meet best available technology requirements (existing sources) or best available demonstrated control technology (new sources) even where that discharge is not the sole contribution to pollution in the waterbody. As stated in today's preamble section VI.B.3., EPA recognizes that multiple stressors, including entrainment and impingement, can cause or contribute to the loss of aquatic organisms and their habitat, impacting the overall viability of aquatic resources. EPA acknowledges that establishing a nexus between a particular stressor and AEI with certainty is often difficult, but nonetheless, considers entrainment and impingement a stressor that can contribute to resource declines. Under Track I of today's rule, the potential for cumulative stressors to aquatic resources must be considered by the permit director and fishery management agencies.

Although EPA acknowledges that MD-PRPP found no substantive cumulative impacts from cooling water intakes of multiple facilities, EPA notes that few such assessments have been made to date. Elsewhere in the record, EPA explains the inherent uncertainties and difficulties of such an approach. In most cases, 316(b) demonstrations were made on a facility-by-facility basis. EPA further notes that concerns have been expressed over declines in fishery populations caused by multiple intakes. Specifically, member states of the Atlantic States Marine Fisheries Commission have requested a study of the cumulative effects of cooling water intakes on winter flounder abundances (see preamble

section VI.B.2.c). For these reasons, EPA is concerned about the potential for multiple cooling water intakes to cause cumulative stressors to fish and shellfish populations and does not believe that one assessment indicating otherwise can form a reasonable basis for disregarding the potential for cumulative effects.

Comment ID 316bNFR.524.029

Subject Matter Code	9.3
	Documentation of I & E Impacts

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DOE points out, in its comments on the NODA, that EPA appears to have emphasized the relatively few cases of documented high impingement and entrainment while ignoring the many cases where impingement and entrainment have been shown to be low. See DOE NODA Comments. DOE cites studies for Bethlehem Steel's Sparrows Point Plant in Baltimore and for Westvaco Paper's Luke Mill on the Upper Potomac River. Both these facilities are located in areas that would be considered sensitive under EPA's proposed rule, yet neither show unacceptable impingement or entrainment impacts. Moreover, DOE points out that not all portions of all estuaries, tidal rivers, and littoral zones are spawning or nursery areas of consequence or are laden with fish that could be impinged. DOE found no reference to the Bethlehem Steel or Westvaco studies in the NODA, even though they vividly depict minimal impacts from actual facilities.

EPA Response

EPA does not agree with the commenter that it has emphasized the relatively few cases of documented high impingement and entrainment while ignoring instances where impingement and entrainment have been shown to be low. EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes. Moreover, there are few records documenting impingement and entrainment rates at the majority of existing facilities. In most cases updated information was not available, however, to the extent possible, EPA has supplemented the facility information in the record for this final rule to include smaller facilities and updated information. EPA is also concerned that extensive data sets, encompassing 20 or more years of data, may be required to adequately assess whether or not populations are being affected by intakes. Under such circumstances a precautionary approach is warranted. For this and other reasons, EPA does not feel it is appropriate to make a determination for new facilities based upon limited data from a few smaller existing facilities.

EPA acknowledges the commenters concern that not all portions of all types of water bodies are alike. Based upon the comments received and the data EPA has evaluated, the Agency has decided to implement a technology based two-track process for all water bodies. EPA believes that this approach is the most satisfactory for addressing the variability of water body types. For additional discussion of issues raised in this comment please see Response to Comment 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.524.030

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Subject Matter Code 10.04

Site-specific Permit Flexibility

UWAG submits, in short, that there is no evidence of cumulative impacts caused by multiple CWISs. Moreover, appropriate monitoring for cumulative impacts in the form of fisheries management and NPDES permitting requirements already are in place and functioning well.

EPA Response

In EPA's NODA for this rule (66FR28853) EPA identified data that suggested approximately 46% of fisheries managed by NMFS were below long-term potential yield and 34% are being utilized. EPA believes this type of information justifies the inclusion of provisions in the final new facility rule that allow permitting authorities to evaluate the need for more stringent requirements on a case-by-case basis.

Both the permitee and the permitting authority have requirements specified in the regulation with regards to cumulative impacts. Section 125.84 (d) states that " You (the permitee) must comply with any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure or monitoring requirements at a new facility that the Director deems are reasonably necessary to comply with any provision of state law, including compliance with applicable state water quality standards (including designated uses, criteria, and antidegradation requirements).

The requirements of the permitting authority are further stated in Section 125.89 (a)(2): For each subsequent permit renewal, the Director must review the application materials and monitoring data to determine whether additional requirements for design and construction technologies should be included in the permit if they are reasonably necessary to minimize impingement and entrainment as a result of the effects of multiple cooling water intake structures in the same body of water; seasonal variations in the aquatic environment affected by the cooling water intake structures controlled by the permit; or the presence of a regionally important species or threatened or endangered species.

Comment ID 316bNFR.524.031

Subject Matter Code	6.1
Current Implementation of Sec. 316(b)	

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John Sevier Station: An Example of Successful § 316(b) Implementation

Not only is there no evidence of cumulative impacts caused by multiple CWISs, but individual examples show that states have, in general, implemented § 316(b) successfully. Two of the listed documents (DCN#: 2-025I and 2-025J) address the Tennessee Valley Authority's ("TVA") John Sevier Station.

The Sevier plant determination stands not for the notion that a CWIS can cause adverse environmental impact, but rather for the idea that, in some cases, mitigation measures can avoid AEI, creating a win-win situation for power suppliers, consumers, and the environment. Indeed, in some cases, mitigation can create benefits that exceed what could be accomplished through CWIS technology modifications. A detention dam at the John Sevier Plant, deemed to be part of the CWIS, prevents the passage of migratory fish from the Cherokee Reservoir up into the Holston River. Initially, one environmental group made it known to regulators that they were in favor of the construction of fish ladders. However, following TVA assessments of behavioral characteristics and life histories of the species involved, literature reviews, and contacts with managers of migratory fisheries in various parts of the United States, TVA concluded, and EPA and the Tennessee Wildlife Resources Agency ("TWRA") subsequently agreed, that ladders would not successfully provide for upstream and downstream movement of all the species of interest. Removal of the dam was determined to be impractical, and its cost tentatively was determined by EPA to be wholly disproportionate to the benefits to be derived. Instead, TVA stocked the upstream reaches of the Cherokee Reservoir with migratory species (including some hybrids particularly attractive to sport fishermen) until such time as the TWRA could construct its own fish-rearing facilities for Cherokee (at TVA expense), which TWRA now uses to provide fish stocks as it sees fit.

The public reaction has been positive since the mitigation stocking was implemented. The public now has access to a good riverine and a good reservoir fishery above the detention dam (including some cool-water species), as well as access to a well-stocked fishery below the dam, including popular hybrid species that were never available before the mitigation project.

TVA testified at one of the Public Meetings on § 316(b) that, "[i]n spite of criticism from some stakeholders, TVA urges EPA to continue to consider mitigation projects, or operational changes, offered by facilities, as viable and prudent mechanisms for reducing or eliminating AEI. In many cases, mitigation projects can restore wholeness to ecosystems that plant technology cannot; can offer fishery management flexibilities that plant technology cannot; can preclude less than expected protection due to technology mechanical failures; and can provide environmental benefits beyond the life of the power generation facility."

The TVA experience reveals, as well as anyone's, how different actual application of § 316(b) can be

from the general notion that power plants are harming fish populations. As TVA said in its November 2000 Comments:

TVA is … concerned, and feels that EPA and stakeholders should be as well, that many currently-operating steam-electric generating plants could not be built and operated as they are today under the proposed rules – despite the fact that monitoring studies have concluded that they are not causing adverse environmental impact. None of TVA's 14 steam-electric generating stations would meet all of EPA proposed new-source requirements; yet, impact assessment studies have been conducted at all 14 sites, reports have been submitted to EPA, NRC, and/or state regulators and other stakeholders, and with a restoration
project at one site, the satisfaction with the lack of adverse environmental impact is such that no current NPDES permits contain requirements to continue 316(b) studies or to modify CWISs. It is questionable public policy to create requirements which would preclude the construction of a needed power generating facility at a site where it could be operated without AEI.

Note that there is concern within TVA, and among many Tennessee Valley stakeholders, for adverse impacts caused by any source. TVA conducts monitoring in all of its reservoirs, and in many rivers and streams, and maintains watershed teams in all of its 11 major watersheds. In coordination or cooperation with partners and stakeholders in the watershed, it conducts assessments and seeks solutions to prioritized water quality, fishing, and aquatic habitat problems. TVA and its partners and teams find, as did the President's Clean Water Action Plan investigations, that habitat destruction, loss of wetlands or wetland functions, and non-point source pollution are the major sources of adverse impact to water resources.

Letter from J. Shipp, Jr., of TVA, to EPA, Water Docket W-00-03, at 2-3 (November 9, 2000).

EPA Response

Today's rule contains, in Track II, the flexibility for a new facility to demonstrate comparable results as those that would be achieved under Track I through a variety of means, including restoration and conservation measures. Track II also allows a site-specific approach where studies may be performed and different options of attaining comparable results as in Track I. See preamble section V and VII for discussions on the basis of today's rule and implementation issues.

Comment ID 316bNFR.524.032

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Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

Other Options

In Part II.E.5 of the NODA, 66 Fed. Reg. 28,862 col. 3, EPA addresses other ways to interpret "adverse environmental impact." One option would be to use § 316(a), which regulates thermal discharges, as guidance. EPA asks whether it would be appropriate to use this standard ("assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on that body of water"), found in §§ 316(a) and 303(d), to evaluate § 316(b) impact from CWISs. 66 Fed. Reg. 28,862-63.

UWAG's position on this issue has not changed since its November 2000 Comments, in which we said:

UWAG believes that this definition would be workable and consistent with the goal of ensuring the sustainability of populations susceptible to entrainment and impingement. Guidance would still be needed, however, on how the standard should be applied to specific types of waterbodies and populations. In essence, the § 316(a) standard is a management goal similar to the goals discussed above under Alternative.

UWAG November 2000 Comments at 77.

EPA Response

Please see responses to comments 316bNFR.008.006, 316bNFR.068.008, and the preamble to the final rule.

A second option would be to define AEI as a level of impingement and entrainment that is "recurring and non trivial." 66 Fed. Reg. 28,863 col. 1, citing 65 Fed. Reg. 49,074. EPA says it might interpret "recurring and non trivial" as the degree of impingement and entrainment that would have resulted from the use of traditional technologies in use when the Clean Water Act was enacted in 1972. 66 Fed. Reg. 28,863 col. 1. This traditional technology, EPA says, would have been a once- through cooling system with a simple bar rack screen to minimize entrainment of large debris items and a simple mesh screen to minimize entrainment of small debris items into the condenser. EPA might focus on the technology, rather than the impact, in a manner analogous to the technology-based standards under §§ 301, 304, and 306. 66 Fed. Reg. 28,863 col. 1. Finally, EPA invites comment on a number of other options for defining AEI that were discussed in the proposal, 65 Fed. Reg. 49,074. 66 Fed. Reg. 28,863 col. 1-2.

Although the § 316(a) approach shows promise, none of these suggestions is as sound as UWAG's proposed definition, which emphasizes impacts at the population and community levels. As a recent article points out, "[t]he reproducing population is the smallest ecological unit that is persistent on a human time scale, and hence the lowest level that we can meaningfully protect." W. Anderson, II & E. Gotting, Taken In Over Intake Structures? Section 316(b) of the Clean Water Act, 26 COLUM. J. ENVTL . L. 1, section V.A.3 (2001) (quoting Suter and Barnthouse; footnote omitted).

EPA's suggestion that AEI might be defined as "recurring and non trivial" impingement and entrainment, and then defining that as the degree of impingement and entrainment that would have resulted from traditional technologies in 1972, is inconsistent with any technology-based standard that EPA has ever set before. Nowhere in the Clean Water Act did Congress suggest that it viewed any particular level of technology as presumptively not meeting the statutory standard. To the contrary, Congress in every case has authorized EPA to prescribe a level of technology consistent with the statutory standard only after collecting data based on the level of pollution control that actual facilities are actually achieving in the real world. In this case, EPA proposes to take what facilities were actually achieving in the real world in 1972 and assume that it is inadequate. There is no precedent for this in EPA's past practice, and no basis for it in the Clean Water Act.

DOE strongly opposes the idea of generalizing that all 1972 technologies were insufficient to avoid AEI. See DOE NODA Comments. It says that the location of an intake and the nature of the fisheries in the waterbody are far more important in determining whether an intake causes AEI than is the choice of technology. DOE does not agree that BTA can be interpreted in a way that focuses on technology rather than impact. DOE believes that EPA must identify the AEI first and then determine if best technology available is really needed at any given location. DOE and Argonne National Laboratory are examining this issue of what constitutes AEI in detail and will provide further recommendations when available.

EPA Response

Please see responses to comments 316bNFR.040.003 (recurring and nontrivial approach), 316bNFR.510.006 (UWAG proposed definition for AEI), and 316bNFR.014.009 (statutory interpretation of AEI process).

Comment ID 316bNFR.524.034

Subject Matter Code	2.3
	Legal/Regulatory History

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If the legislative history of the Clean Water Act says anything about what Congress intended, it tells us that Congress was concerned about a very few large power plants and that it also was concerned lest the control technology prove too costly. Neither of these concerns is consistent with EPA's suggestion that Congress expected that every plant existing in 1972 would need a major retrofit.

EPA Response

Existing facilities are outside the scope of this rule. EPA has considered the economic practicability of the requirements of this rule governing new facilities. EPA disagrees that section 316(b) only applies to very large power plants. United States Steel v. Train, 556 F.2d 822, 849 (7th Cir. 1977)(In response to U.S. Steel's argument that section 316(b) only applies to steam electric plants, the court stated "We reject these arguments. First, § 316(b) applies on its face to all technology-based effluent limitations 'applicable to a point source' . . . Thus, § 402(a)(1) implicitly requires the Administrator to insure compliance with § 316(b) as one of the permit conditions. See also Appalachian Power Co. v. Train, supra, 545 F.2d at 1371-1372.")

Comment ID 316bNFR.524.035

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Subject Matter Code 12.11

5% Mean Annual Flow

Proportional Flow Limits

In Part II.F.1 of the NODA, 66 Fed. Reg. 28,863-64, EPA addresses the presumption that entrainable organisms are distributed uniformly throughout the water column and, therefore, that withdrawing 5% of the flow also will entrain 5% of the organisms. Here, EPA refers back to information on the density of organisms in the Hudson and Delaware Rivers and Mt. Hope Bay (DCN#: 2-013D and E) and information on models identified by EPRI that may be used to estimate or evaluate aquatic organism densities in order to estimate entrainment rates. 66 Fed. Reg. 28,863 col. 2. EPA notes that assessments of organism densities are the basis for calculations for the empirical transport model, which is in turn the basis for calculating conditional mortality rates. EPA asks for comment on six documents that it says support the need for flow-based standards to protect aquatic organisms. 66 Fed. Reg. 28,863 col. 3.

Finally, EPA asks for comments on the effectiveness of the proposed limitation associated with the mean annual flow of freshwater streams and rivers. EPA postulates that the withdrawal of large volumes of water year-round may, over the course of the year, smooth out the "patchiness" of the distribution of aquatic organisms and make the proportion of biota approximately equal to the proportion of flow. EPA asks whether a proportional flow standard based on mean annual flow proposed at 40 C.F.R. 125.84(b) will protect effectively smaller freshwater rivers and streams from impingement and entrainment proportional to the volume of water withdrawn from those waterbodies. 66 Fed. Reg. 28,864 col. 1.

UWAG believes that using percentage-of-flow as a screening criterion can be useful. Indeed, the second track in the Two Track proposal uses a 5% of flow screen to screen out facilities that clearly will not cause AEI.

But such criteria must be used with caution. There are many assumptions underlying the use of percentage-of-flow, the principal one being the assumption that organisms are distributed uniformly throughout the water, so that withdrawing 5% of the flow also withdraws 5% of the entrainable organisms. That is why the proposed Two Track proposal recognizes that, in addition to the percent screens, one must make sure that the intake does not come from an especially sensitive area, such as a place where eggs or larvae accumulate.

The 5% screening volume in the Two Track approach is extremely conservative. A loss of 5% of the entrainable life stages of a fish population would be unlikely to be noticed amidst compensation and the natural variation in the population. Hence, a 5% volume withdrawal, so long as it was not taken directly from a unique or critical spawning ground or other sensitive area, also would be very conservative. But while a 5% volume withdrawal is very conservative, and thus appropriate as a screening mechanism, it is not at all appropriate as a tool for determining whether AEI will occur.

What is “adverse” is a site-specific determination and depends on the species and life stage affected and whether there is a population level impact. A 10% loss of gizzard shad may be biologically insignificant depending on site-specific circumstances.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for consistent protection of species impacted by CWISs across all waterbody types. EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones.

Instead of varying requirements based on waterbody type EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

EPA believes it has presented ample evidence demonstrating a significant decrease in the level of impingement and entrainment when intake flow is minimized. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment. EPA believes the intake capacity standard established under today's final rule provides an adequate level of protection and is economically practicable and technically available to all new facilities.

EPA believes 5% mean annual flow requirement for freshwater rivers and streams achieves an acceptable level of protection for the source water while remaining economically and practicably reasonable for new facilities.

Comment ID 316bNFR.524.036

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Subject Matter Code 12.21

Thermal Stratification

Stratification in Lakes and Reservoirs

In Part II.F.2 of the NODA, EPA asks whether the withdrawal of large quantities of subsurface water from lakes or reservoirs that are naturally stratified will affect negatively a lake's thermal stratification and seasonal turnover dynamics. 66 Fed. Reg. 28,864 col. 1. The Nuclear Regulatory Commission's extensive Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437) examined the possibility of altered thermal stratification and deemed it a "Category 1" issue, meaning that additional site-specific study of the potential impact is not required. The GEIS states:

Based on a review of the published literature and operational monitoring reports, operation of the cooling system has not altered thermal stratification at most power plants with once-through cooling systems. At the small number of plants where changes in thermal stratification have occurred, monitoring and modeling studies have been used to adjust thermal discharges, thereby mitigating adverse impacts. . . . The impacts of altered thermal stratification will continue to be of small significance. GEIS, Vol. I, p. 146 of 531.

EPA also is considering whether cooling water withdrawals from deeper, colder areas and the discharge of used cooling water near the surface may bring nutrient-rich hypolimnion water to the surface, where it may stimulate the growth and respiration of harmful levels of algae and other biological assemblages. 66 Fed. Reg. 28,864 col. 1. The NRC also has considered – and dismissed – this question for the large withdrawals typical of nuclear power plants. The GEIS states:

Review of literature and operational monitoring reports, consultation with utilities and regulatory agencies, and review of comments on the draft GEIS indicate that power plant induced eutrophication has not been a problem at any existing nuclear power plant. Monitoring studies have not revealed cumulative impacts, and no concerns about nuclear power plants contributing to eutrophication in a cumulative way were expressed by regulatory agencies. Effects are considered to be of small significance for all plants.
GEIS, Vol. I, p. 147-48 of 531. See also UWAG November 2000 Comments, pp. 193-94.

EPA asks whether the proposed limitation to "not alter" or "not upset" natural stratification is not sufficiently clear. As UWAG's November 2000 Comments reflect, this criterion is technically and legally flawed and should not be a part of the final rule. UWAG November 2000 Comments, pp. 193-94. Any power plant intake and discharge located on a lake or reservoir will "alter" the stratification in some way. The real issue is the degree of alteration and the significance of the alteration to the resident aquatic organisms. Furthermore, since § 316(b) gives EPA authority only over the CWIS, not over discharges, it is inappropriate to impose such a requirement in this rulemaking.

EPA asks for comments on DCN#: 2-027A ("Cumulative Impacts of Power Plant Cooling Systems on Lake TMDLs"), claiming that it "supports maintaining natural stratification." 66 Fed. Reg. 28,864 col. 2. The simulations of the impoundment presented in this paper indicate that operation of the power plant cooling system draws water from depth and releases it on the surface, reducing the chlorophyll-a concentration in the surface waters – and thereby improving water quality. The paper supports the use of dynamic models to track interactions among various waterbody changes, such as thermal stratification, nutrients, and algal growth – it does not address whether, and under what circumstances, natural stratification is to be preferred.

For power plants on lakes and reservoirs, eliminating all effects on thermal stratification is simply not feasible. In a typical case (i.e., a power plant drawing water from above the thermocline and discharging above the thermocline as well) the power plant will alter the thermal stratification of the lake or reservoir by increasing the volume of water above the thermocline. The power plant adds heat to the lake in addition to the heat added by the sun. The heat added to the lake by the power plant either increases the epilimnion water temperature, mixes with hypolimnion water to lower the depth of the thermocline and/or temporarily eliminates the thermocline (in the mixing zone), or is lost to the atmosphere. Depending on the physics at any given instant, a combination of all three usually is occurring if there is a hypolimnetic discharge.

Generally, a power plant adds very little heat compared to the amount added by the sun. If a power plant becomes the major thermal input to the lake or reservoir, there is too little cooling capacity (i.e., the rate of heat loss to the atmosphere cannot keep up with the heat gain from the power plant), and the water will get too hot for the plant to operate during the summer. The lake also would become too warm for most aquatic life to survive.

Power plants tend to increase the stability of the stratification unless the mechanical agitation of the intake and discharge water disrupts it. However, disrupting the thermocline requires a great deal of energy (depending on its magnitude), just as a great deal of energy goes into establishing the thermocline. Agitation at the thermocline mixes the cool hypolimnion water with the warm epilimnion water. As the thermocline gets deeper, surface agitation from wind and power plant discharges has less effect on agitating water at the thermocline. Thus, the deeper the thermocline, the more stable it becomes.

Moreover, stratification of a lake is not always beneficial. In many – if not most – cases, destratification is a positive development for aquatic organisms. In fact, TVA has installed fans on the surface of one of its reservoirs, thereby oxygenating water that otherwise would have been anoxic. At other sites, TVA has adjusted the normal flow through its reservoirs to create mixing and prevent stratification and hypoxia.

EPA Response

EPA believes the natural thermal stratification of a lake, if present, influence the physical and chemical cycles of lakes, which, in turn, strongly govern their production, utilization, and decomposition. A facility with a disproportionately large water intake can adversely impact both primary and secondary production. EPA believes the intake capacity standard for lakes and

reservoirs is economically practicable and technologically achievable for new facilities, and will result in an acceptable level of source water protection.

While no percentage restriction is included for lakes and reservoirs in today's final rule, new facilities located on a lake or reservoir are required to establish a maximum intake capacity that will not disrupt the natural thermal stratification or turnover pattern of the source waterbody where such stratification or turnover pattern is determined to be beneficial. EPA believes an "across-the-board" limit is unworkable for lakes and reservoirs since the concept of flow is inapplicable to a lake. In addition, EPA believes preserving some degree of the natural thermal stratification, if present, is desirable because of the increased cooling efficiency that can result. The thermal stratification standard, while different from the flow-based standards for estuaries and freshwater rivers, does limit a new facility to an intake capacity that will achieve an acceptable level of protection for the source water.

EPA expects new facilities located on a lake or reservoir to work in conjunction with the permitting authority to correctly determine what constitutes an unacceptable disruption of any natural thermal stratification or turnover pattern.

Comment ID 316bNFR.524.037

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Subject Matter Code 13.1

Requirement of 0.5 fps

Velocity

In Part II.F.3 of the NODA, 66 Fed. Reg. 28,864 col. 2, EPA addresses its proposed maximum design intake velocity limit of 0.5ft/s. As UWAG stated in its original comments, EPA's proposed 0.5 ft/s through-screen velocity criterion is overly conservative for many sites. UWAG November 2000 Comments, pp. 135-36. A direct relationship between velocity and impingement is not supported by the available data. To the contrary, a variety of studies either indicate a lack of correlation between velocity and impingement or else identify other factors that do influence significantly the number of fish impinged. The absolute value of the velocity approaching and entering the CWIS is not the determining factor for impingement.<fn16> Instead, the change in velocity, if it is of sufficient magnitude, and the subsequent change in hydraulic conditions can provide the cues fish need to avoid the intake. Id.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

See response to comment 316bNFR.206.116 for information on avoidance behaviors of fish at intakes.

Also see responses to comments 316bNFR068.080, 316bNFR068.081, 316bNFR068.082, 316bNFR068.106, and 316bNFR068.107 for information on previously submitted comments.

Comment ID 316bNFR.524.038

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Subject Matter Code 13.1

Requirement of 0.5 fps

UWAG reiterates that approach velocity is much more relevant than a through-screen velocity (such as EPA's maximum design intake velocity) for assessing § 316(b) impacts. The approach velocity is the velocity from which fish must escape in order to avoid impingement. With this principle in mind, UWAG will address EPA's specific questions regarding velocity.

EPA Response

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

Also see responses to comments 316bNFR068.080, 316bNFR068.081, 316bNFR068.082, 316bNFR068.106, and 316bNFR068.107 for information on previously submitted comments.

Comment ID 316bNFR.524.039

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Subject Matter Code 13.1

Requirement of 0.5 fps

Section II.F.3 discusses additional information relevant to proposed velocity limits. EPA has developed a graph of swimming speed data and states:

The Graph (Swim Speed Data, #2-029 in the Docket), is a compilation of the data EPA received on fish swimming speeds as it varies with the length of the tested fish and with water temperature. These data show that, not accounting for any safety margin to address screen fouling (which increases velocity in screen areas that remain open), a 1.0 ft/s velocity standard would protect 78 % of the tested fish, and a 0.5 ft/s velocity would protect 96 % of these fish. EPA is evaluating these data and considering whether to maintain or modify the proposed velocity limitation.

66 Fed. Reg. 28,864 col. 3. The swim speed data presented in the table, which is developed in part from both the Turnpenny (1988) and EPRI (2001) reports, rely almost exclusively on results from laboratory studies. The fish behavior observed in the laboratory may or may not accurately reflect the behavior of fish swimming in front of a CWIS (EPRI 2001). Fish used in laboratory studies are likely to be stressed from handling and confinement, and the effects of such stress needs to be considered before making assumptions about fish behavior in an open water setting. Site-specific factors, such as water temperature, water quality, and turbidity, also will play an important role in the ability of fish to avoid impingement at a CWIS. And often the more important question is whether or not fish are attracted to the area of the CWIS.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

EPA recognizes that swimming speed data collected in a laboratory setting may not match data for fish in the wild. However, as stated in EPRI's Technical Evaluation of the Utility of Intake Velocity as an Indicator of Potential Adverse Environmental Impact under Clean Water Act Section 316(b), "laboratory results [can] be indicative and useful in predictive assessments … of actual impingement rates." It adds, "[t]he relevance of laboratory data has been questioned, but appears to have been upheld, at least in broad terms." The document further states that the exact correlation between laboratory and field data is unknown, but that such a level of detailed analysis may be unnecessary. EPA agrees and notes that it is promulgating a conservative national standard and that the use of laboratory data is appropriate in such a situation.

Comment ID 316bNFR.524.040

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Subject Matter Code 13.1

Requirement of 0.5 fps

One of EPA's concerns is the effects of tidal and long-shore currents on velocities in the vicinity of velocity caps. 66 Fed. Reg. 28,865 col. 1. EPA also cites the American Society of Engineers' Design of Water Intake Structures for Fish Protection (DCN#: 2-032), suggesting that design velocities should range from 0.5 ft/s to 1.5 ft/s, and asks for comment on allowing velocities of up to 1.5 ft/s at offshore intake structures with velocity caps in all types of waterbodies. 66 Fed. Reg. 28,865 col. 1. UWAG strongly agrees that different velocity values are not only appropriate, but necessary, for various types of intake technologies. As discussed in our November 2000 Comments, certain technologies, such as angled screens, depend on velocities greater than 1.5 ft/s. See EPRI Technology Review (1999), p. 4-1 - 4-21. UWAG cautions EPA against applying a single velocity value to all types of CWIS designs. Such an approach will rule out many effective intake technologies. UWAG already has provided some comments on velocities for velocity cap intakes (UWAG November 2000 Comments, Appendix C, pp. 33-36). UWAG offers the following additional information.

Early research conducted in 1956 by F.R.H. Jones indicated that fish cannot sense a vertical displacement of flow to any substantial degree. Up to that time, offshore intakes were generally open pipes built up from the ocean or lake bottom, possibly with a large-spaced trash rack over the opening. With the understanding that fish are better able to perceive velocity gradients in a horizontal direction than in a vertical direction, the velocity cap design was conceived (Figure 1).

Figure 1. Schematic of Offshore Intake with and without a Velocity Cap (Source: Weight 1958)

[see original document for figure]

The retrofit of a velocity cap intake at the El Segundo Steam Station in California was reported to reduce impingement by 95% relative to the uncapped intake (Weight 1958). Based on these results, a velocity cap was designed to reduce fish entrainment at an intake for California Edison's Huntington Beach Steam Station. Prior to final design, a scale model of the proposed design was constructed to develop optimum hydraulic performance. During these tests, live fish were exposed to the capped and uncapped model intakes.

Test results were startling. Without a velocity cap the small fish were swallowed up and rapidly disappeared into the pipe. However, it was almost impossible to draw any fish into the pipe when the velocity cap was being used. It was amazing to watch schools of small fish swim towards the pipe and then turn and swim away as the horizontal tug of velocity warned them of danger.(Weight 1958).

These observations substantiate those of F.R.H. Jones. It is significant that the El Segundo Station incorporates an entrance velocity of 3.5 ft/s while the Huntington Beach intake was designed for a 2.0 ft/s entrance velocity. In fact, Weight (1958) reports:

It is the opinion of the engineers concerned that the entrance velocity is not highly critical for this type of installation as long as it is greater than a fish normally experiences. A range of 1 to 3 feet per second is recommended as acceptable for design.

This opinion is substantiated by two laboratory studies that addressed the relationship between velocity and entrapment of alewives (SWEC 1976; SWEC 1978). In these studies, two identical offshore intake structures (opening size of 5 feet wide by 2 feet high in a water depth of 6 feet) were operated at different velocities over a range from 0.5 to 2.0 ft/s. In the first study, an inverse relationship was found between inlet velocity and entrapment (Figure 2; SWEC 1976).
In the second study, no correlation was found between velocity and entrapment of alewives (SWEC 1978).

[see original document for table]

In conclusion, there is sufficient evidence to suggest that higher velocities (up to 3.0 ft/s) may be more effective in preventing fish entrapment into an offshore velocity cap intake than lower velocities (e.g., 0.5 ft/s). As EPA notes (66 Fed. Reg. 28,865 col. 1), ambient current direction and magnitude need to be considered in selecting an appropriate velocity for a given site.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.001.001 for information on the intake configuration.

Comment ID 316bNFR.524.041

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Subject Matter Code 13.1

Requirement of 0.5 fps

The EPRI study (DCN#: 2-028A), entitled "Technical Evaluation Of The Utility of Intake Approach Velocity as an Indicator of Potential Adverse Environmental Impact Under Clean Water Act Section 316(b)," is a sound study, and UWAG urges EPA to take it into account. The important thing to note is that it shows 0.5 ft/s to be a very conservative number from the standpoint of fish protection. But it is not a performance standard that is necessary to prevent AEI.

EPA says that its questionnaire data show that 62% of the electric power plants built in the last 15 years meet the proposed 0.5 ft/s velocity limit.<fn17> Apparently 38%, then, did not meet the proposed limit, showing that many regulatory authorities have found a higher intake velocity acceptable.

In any event, the mere number or percentage of power plants achieving a certain velocity limit does not say anything about the efficacy of protecting fish unless it is coupled with information about environmental impacts at the plants that have achieved the limit. As UWAG pointed out in its November 2000 Comments, the setting of technology-based standards requires EPA to investigate what technologies are in use, how effective they are in controlling pollution (or, in this case, minimizing environmental impact), and what they cost. UWAG November 2000 Comments, pp. 173-74. The cataloging, as EPA has done, of how many plants have which intake technologies may be a start in determining the first of these questions, but it addresses the second and third not at all.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

Past permitting decisions were made using the best judgment at the time of the decision and reflect site-specific circumstances. These determinations do not necessarily bind EPA when promulgating national BTA regulations.

Comment ID 316bNFR.524.042

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Subject Matter Code 13.1

Requirement of 0.5 fps

EPA asks where velocity should be measured. EPA states:

EPA is considering comments on where velocity should be measured. Some commenters assert that velocity should be measured on the basis of "approach-velocity" rather than the proposed design intake velocity (also known as through-screen or through-technology velocity). Other commenters assert that velocity should be measured where its value is highest, which might be at the screen face or at another location in front of the screen (for example, at a narrow constriction in an intake canal or at a narrow opening in a curtain wall placed in front of the screen).
(See W-00-03, 316(b) Comments 2.06 (River Keeper) and 1.56 (EPRI). EPA is also providing for comment, the document contained in #2-033 in the Docket.

66 Fed. Reg. 28,865 col. 1-2. From a biological perspective, the velocity immediately upstream of the traveling screen in a shoreline CWIS (i.e., screens oriented 90 degrees to the approach flow, including canal, jetty, and flush-mounted layouts) is the most pertinent. It is at this point that fish within the CWIS can proceed no further and eventually will interact with the screen unless they move back upstream, away from the screen. To correlate the physiological and behavioral responses of fish to velocity as a stimulus, one must measure the velocity in the immediate vicinity of the fish. The cues generated by moving water (pressure, turbulence, shear) that a fish receives are generated by the physical layout of the screenwell. Naturally, contact (e.g., tail-touching) with the screen is a physical cue that is detected by the fish. However, such contact has little to do with velocity through the screen mesh. Therefore, the most appropriate velocity to measure is that immediately upstream of the screen face where any near-field screen effects (e.g., blockage by screen members or non-uniform loading of debris) will not be measurable. For a clean screen, this point is very close to the screen mesh. Obtaining velocities at this point (short of calculating them based on flow rate and cross-sectional area) is difficult or impossible in many cases due to inaccessibility. However, in most screenwell designs, the side walls in the vicinity of the traveling screen are parallel. Therefore, the velocity further upstream (e.g., 1 foot) will not vary substantially from that at the screen face. As such, a measurement point in the upstream area of the screen will provide necessary information on approach velocity in most cases.

Most screenwells have features that will result in some non-uniformity of flow (e.g., curtain walls and trash racks). They also may be influenced by longshore currents in the vicinity of the CWIS that can skew the flow, and velocity profile, in a screenwell. Therefore, it is appropriate to measure velocities at a number of locations upstream of the screen to map the velocity distribution. The average of the point measurements then will represent the "approach" velocity.

As a practical matter, accurately measuring velocities through screens, particularly traveling screens, will be difficult if not impossible in most screenwells. The current technology for measuring velocities through small openings is limited. Acoustic doppler velocimeter ("ADV") techniques are available for

measuring both velocity magnitude and direction and might be considered if through-screen velocities were needed. However, the accuracy of ADV data is highly dependent on the ability to position precisely the measurement probe. Therefore, while accurate measurements of through-screen velocities may be achievable with wedge wire and other stationary screens, it is unlikely that ADV measurements at a traveling screen face could be obtained with any degree of accuracy.

If screens (or other diversion devices such as louvers and Modular Inclined Screens) are angled to the flow to guide fish to a bypass, different velocities and vectors should be measured. These screens are discussed in detail in the EPRI (2001) report. At offshore velocity cap intakes, the velocity at the entrance to the velocity cap is of greatest importance. Due to the remote location of such intakes, measuring velocities will be very difficult and expensive.

EPA Response

See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

See response to comment 316bNFR.001.001 for information on the intake configuration.

See response to comment 316bNFR.206.116 for information on required inspections to maintain clean intakes.

See response to comment 316bNFR.206.119 for information on entrapment of fish in intake structures.

Comment ID 316bNFR.524.043

Subject Matter Code	23.3
State Burden and Costs for Permitting Activities	

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Burden of the Case-by-Case Approach

In Part II.F.4 of the NODA, EPA recites comments by the states of Michigan and New Jersey specifically expressing concern about the existing case-by-case approach to § 316(b). EPA asks for comment on additional information documenting resources that several states have devoted to implementing § 316(b) on a case-by-case basis. 66 Fed. Reg. 28,865 col. 2.

The question of how much time and effort should be devoted to implementing the regulatory scheme is an important one. An entirely case-by-case approach for new facilities, such as the one that has been used in the past, may produce very finely-tuned decisions, but at some cost in terms of analysis and review by regulatory agencies. A more mechanical approach with rigid rules, like EPA's original "zoning" approach, may require less time and effort, but at the cost of producing less-refined decisions and consuming economic resources on technology that is overprotective.

Even EPA's zoning approach would not avoid the need for at least some site-specific consideration, because EPA apparently intends that each new facility would plan and perform instream studies to delineate the littoral zone and characterize biological populations instream, all of which would have to be reviewed and approved by the permit writer. The permit writer then would have to assess the results to determine whether additional CWIS "design and construction technologies" were needed to minimize AEI. If the permit writer determined that they were needed (using a standard EPA has not specified), the permittee would have to develop, and the permit writer would have to review and approve, some proposed technology or technologies (again, in accordance with standards EPA has not specified). Under EPA's proposal, new facilities on estuaries or tidal rivers would have to develop plans for additional technologies regardless of the results of any baseline biological characterization or littoral zone study (although both would still be required). Thus, EPA's current proposal incorporates the worst aspects of the mechanical and the site-specific approaches.

The Two Track approach, on the other hand, avoids both extremes. In cases where a would-be facility operator judges that his resources will be better used by avoiding lengthy regulatory review, he can commit to highly protective technology in return for a speedy decision. In cases where the operator thinks that such technology would be too costly and overprotective, he can commit resources instead to studies of the waterbody.

EPA should not assume, however, that the amount of time and regulatory effort spent on § 316(b) decisions in the past accurately predict the amount of effort that would be needed in the future. Case-by-case decisions in the past were made without the benefit of the § 316(b) regulation or of final guidance from EPA. Moreover, we now have accumulated a large amount of historical information about aquatic ecosystems and have developed better models for predicting environmental impacts. One, therefore, would expect that even case-by-case decisions in the future can be made more

efficiently than those in the past. The Two Track approach, since it provides appropriate options and clear endpoints, would reduce the costs and administrative burdens of implementing § 316(b).

Moreover, experience suggests that the case-by-case approach in the past has not been all that bad. Many state regulatory programs have worked well, including Maryland's, as noted above.

EPA also has supplemented the rulemaking record with information from the states of New Jersey and New York regarding the costs incurred by those states in administering § 316(b) using the current case-by-case decisionmaking approach. New Jersey provided information about costs associated with its review of the 1999 permit renewal application of PSEG-Salem (DCN#: 2-034B).

As to New Jersey, Salem is not a typical § 316(b) review. Salem's permit renewal application consisted of 167 binders, which is well beyond the size of the average permit application for facilities with CWISs. It is not surprising that New Jersey hired a contractor to review the filing, given its size and complexity. Indeed, New Jersey notes that Salem has "one of the largest [water withdrawal volumes] in the nation," that it has voluntarily undertaken the largest privately funded wetlands restoration in the nation, and that it presents "the most significant Section 316 issues" in the state. Therefore, the Salem cost information is of little utility in attempting to understand typical state burdens in administering § 316(b).

Likewise, the information provided by New York (DCN#: 2-034A) is not particularly useful. New York estimated its costs for 1997, 1998, and 2001 but did not relate these costs to the numbers of facilities subject to § 316(b) evaluation. For example, New York estimates that its Division of Fish, Wildlife and Marine Resources spent $169,857 on § 316(b) reviews in 1997 but does not specify how many facilities were reviewed that year. Since the many Hudson River facilities conduct extensive annual monitoring studies, the 1997 expenses may be partially related to review of that material. In this case, New York gains substantial benefits from the long-term Hudson River studies – benefits that may well exceed the costs the state has incurred.

EPA Response

EPA discusses the shortcomings of the current case-by-case approach to 316(b) reviews in section II.C.4 of the preamble to the final rule. The case-by-case approach has proved to be costly, time-consuming and subject to challenge. In addition, approaches to implementing section 316(b) on a case-by-case basis have varied greatly across the states.

EPA elected not to establish requirements for new facilities based on location of the cooling water intake structure within the waterbody (such as whether or not the intake is located within the littoral zone) for the reasons discussed in sections V.B. and VI.C of the preamble for the final rule.

EPA agrees that the two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility to operators by including a performance-based alternative. Under the final rule, EPA has established its preferred two-track option as the best technology available for minimizing adverse environmental impact. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a

National Pollutant Discharge Elimination System (NPDES) permit without delays. Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement mortality and entrainment from cooling water intake structures. EPA also agrees with the commenter's assessment that the two-track approach will reduce the costs and administrative burdens of implementing 316(b).

In general, EPA agrees with the commenter's assessment of the limitations of the information from the states of New Jersey and New York regarding the costs incurred by these states in implementing section 316(b) under the current case-by-case approach. However, this information does provide an indication that the costs of implementing section 316(b) requirements under a case-by-case approach can be substantial. In particular, the information from New Jersey regarding the 316(b) review for the Salem power plant could be viewed as an estimation of the upper end (i.e., a worst-case estimate) of the potential costs to a state of reviewing 316(b) materials under a case-by-case approach.

Comment ID 316bNFR.524.044

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Subject Matter Code 23.3

State Burden and Costs for Permitting Activities

DOE says that prescribing minimum national technology requirements in the interest of preserving state resources appears to be counter to Administrator Whitman's goal of providing increased flexibility to the states to develop their own regulations with limited federal guidance. See DOE NODA Comments. DOE believes that most states would dislike the removal by a national rule of the regulatory flexibility they now have. DOE suggests that EPA poll a larger number of state water pollution control agencies to get a better national perspective than that provided by the four out of five states that commented on this issue.

In addition, DOE finds expediency a poor basis for establishing costly regulatory programs. As DOE puts it, if § 316(b) is important enough for EPA to revisit it in the late 1990s after twenty years of successful state regulatory activity and then devote years of effort to develop regulations, then it seems that regulatory agencies should be expected to devote serious attention to implementing the program.

EPA Response

EPA believes that the final rule provides State permitting authorities with a consistent, well-defined national framework upon which to base permitting decisions related to cooling water intake structures, thereby streamlining the permitting process while retaining a high degree of flexibility and site-specificity. The two-track approach allows permittees to consider site-specific conditions in selecting a permitting track and implementing appropriate technologies. All aspects of permitting are subject to review and approval by the permitting authority. Specifically, States are expected to review information provided in permit applications, and make determinations as to the appropriateness of the planned design and construction technologies, and (for Track II) Comprehensive Demonstration Study methodologies and results. State permitting authorities will also verify that facilities meet the appropriate proportional flow requirements. States will have the authority to include additional or alternative requirements in reissued permits to account for site-specific issues. Furthermore, the final rule applies to a specific universe of facilities that meet the established intake flow and cooling water use thresholds. Any new facility that has or requires an NPDES permit but does not meet the applicability thresholds established in the final rule will continue to be subject to permit conditions established by the permit director on a case-by-case basis using best professional judgment. Sections VII.C and VII.F of the preamble to the final rule describe the role of the permitting authority in more detail.

In response to the commenter's suggestion that EPA poll additional State agencies to get a better national perspective, EPA believes that it has conducted sufficient outreach activities to satisfy the requirements of section 6 (Consultation) of Executive Order 13132, which concerns Federalism, even though this section does not apply to this rulemaking. In developing the rule, EPA conducted several

outreach activities through which State and local officials were informed about the proposed rule and they provided information and comments to the Agency. EPA met with the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). With ASIWPCA's assistance, EPA conducted a conference call in which representatives from 17 States or interstate organizations participated. EPA also held two public meetings to discuss issues related to the rulemaking effort. Representatives from New York and Maryland attended the meetings and provided input to the Agency. EPA also contacted Pennsylvania and Virginia to exchange information. In addition, EPA Regions 1, 3, 4, and 9 served as conduits for transmittal of section 316(b) information between the Agency and several States. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials. Additionally, EPA met with industry, environmental, and State and Federal government representatives to discuss regulatory alternatives for the new facility proposal. A summary of the concerns raised during consultation and EPA's response to those concerns is provided in the record of the final rule.

EPA agrees that 316(b) is an important issue and the Agency does expect States to devote serious attention to implementing the program. While the Agency believes that the establishment of a consistent, well-defined national framework will expedite the permitting process, EPA contends that expediency is not the basis for establishing the rule. The final rule is intended to provide a national framework within which States may make more consistent decisions about technology requirements associated with cooling water intake structures, while retaining flexibility for those facilities that wish to demonstrate appropriate site-specific, alternative technologies for minimizing adverse environmental impacts.

Comment ID 316bNFR.524.045

Subject Matter Code	10.01
	Regulatory Framework Options

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Recently Constructed Facilities Already Implementing the Proposed New Facility Requirements

In Part II.F.5 of the NODA, EPA recites questionnaire data indicating that 47% of the recently constructed manufacturers', 42% of the recently constructed nonutilities', and 53% of the recently constructed utilities' facilities meet the proposed requirement to install additional design and construction technologies, such as traveling screens with fish return systems, wedge wire screens, or fine mesh screens with a fish return system. 66 Fed. Reg. 28,865 col. 3. Preliminary data from the questionnaires also show, EPA says, that 38% of the manufacturing facilities, 66% of the nonutility facilities, and 70% of the utility facilities have closed-cycle, recirculating cooling systems. 66 Fed. Reg. 28,865 col. 3. Finally, EPA claims its questionnaire data show that 16% of the manufacturers, 31% of the nonutilities, and 44% of the utilities meet all three of the proposed requirements for (1) reducing intake capacity to a level commensurate with closed-cycle recirculating cooling, (2) reducing intake velocity to no more than 0.5 ft/s, and (3) developing a plan and installing additional design and construction technologies. EPA asks if, based on these data, it is reasonable for new facilities to meet these proposed standards. 66 Fed. Reg. 28,866 col. 1.

These figures show that, in a substantial number of cases, permit writers have concluded that wet cooling towers or all three of the stringent requirements are not required at particular sites. Thirty percent of utility power plants, for example, do not have closed-cycle cooling. Beyond that, however, these numbers show only that the various requirements were deemed to be feasible, and presumably protective, at some sites, under the circumstances that prevail there. They tell very little about what is "best" technology available for other sites.

DOE says that the fact that 44% of the facilities constructed in the last 15 years meet all three proposed requirements (design and construction requirements, reduced flow volume restrictions, plus the proposed rule's velocity requirements) should have "little bearing" on the new requirements. Just because 44% of relatively new utilities meet a certain set of requirements should not be the basis of setting new requirements for all new power plants. Rather, the new requirements should be based on good science and policy. DOE says there is no way to determine why those 44% of plants ended up with all three sets of requirements. Indeed, DOE says it may be informative to examine what types of requirements the other 56% of recent utilities used and why.

EPA Response

See response to comment 316bNFR.501.021. EPA does not believe that existing performance by a large number of facilities is relevant to a determination of best technology available for minimizing adverse environmental impact because it shows that such performance is technically available and economically achievable.

Comment ID 316bNFR.524.046

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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Energy Consumption for Different Cooling Systems

In Part II.G.1 of the NODA, 66 Fed. Reg. 28,866, EPA requests comment on energy penalties imposed by dry and hybrid cooling towers compared to wet cooling towers and once-through cooling systems. EPA claims it received a "limited amount of information . . . through public comment" on the subject of the "comparable efficiencies" of cooling towers (wet, dry, and hybrid) to once-through cooling systems. 66 Fed. Reg. 28,866 col. 1. Appendix F to UWAG's November 2000 Comments provides detailed estimates of the auxiliary power needs and energy penalties associated with dry cooling for five climactically different locations. UWAG recognizes that the Tellus Report, which was a part of the Riverkeeper's comments, provides a different perspective on the efficiency of, and energy penalties associated with, dry cooling. UWAG's Critique of the Tellus Report is Appendix A to these comments, and documents some significant flaws in that Report.

EPA also provides for comment on a new SAIC report on energy penalties. (DCN#: 2-036C). The SAIC report, by its own design, is of limited utility for purposes of this rulemaking. First, it does not address energy penalties associated with dry cooling. Second, its focus is on the energy penalties associated with retrofitting wet recirculating cooling towers on existing once-through cooling systems. The energy penalties for retrofits are quite different from those for new facilities being designed with wet cooling towers. Moreover, UWAG has documented significant technical and engineering errors in the report that render its conclusions highly suspect. Appendix B to these comments is a memorandum describing these flaws.

EPA Response

This response addresses the first paragraph of comment 316bNFR.524.046 which references Appendix A to UWAG's notice of data availability comments and Appendix F to their comments on the proposal.

See responses to comments 316bNFR.368.001 through 316bNFR.368.014 which address Appendix F of UWAG's comments on the November 2000 proposal.

EPA has reviewed the referenced critique (Appendix A to UWAG's comments on the notice of data availability) of the Tellus report (which was submitted as a reference for Riverkeeper's comments on the November 2000 proposal). Generally, EPA agrees with the technical conclusions reached within the critique regarding the errors presented in the Tellus report (also see comment response 316bNFR.206.013). However, EPA takes issue with several points made in Appendix A, especially those of editorial nature.

EPA disagrees with the assertion made in paragraph 8 of Appendix A asserting that dry cooling plants will lose approximately one-third of their steam-turbine generation capacity during peak-summer shortfalls. For the sake of clarity, EPA prefers to present and discuss energy penalties in terms of the total plant impacts, rather than at the turbine specific level. EPA notes that the majority of recently constructed, permitted, and proposed plants with dry cooling designs are combined-cycle plants. Because approximately one-third of the capacity of a combined-cycle plant is generated through the steam-turbine, and the other two-thirds is generated by combustion turbines (which have no steam to condense and, therefore, do not require cooling), the presentation of the peak-summer shortfall in the manner of the commenter is misleading. Converting the value presented by the commenter to plant-wide estimates gives a peak-summer shortfall of 11 percent. In contrast, EPA estimates that a combined-cycle plant would experience a peak-summer shortfall, on a plant-wide basis, between 2.4 and 4.3 percent when equipped with a dry cooling system. As an aside, for the few coal-fired plants constructed with dry cooling systems, EPA estimates peak-summer shortfalls for a plant-wide basis in the range of 8.9 to 19.4 percent. In conclusion, EPA considers the maximum energy penalty estimates presented by the commenter to be an overestimate.

In paragraph 11 the commenter references a "recently completed study comparing wet and dry cooling systems," which is a reference to Appendix F to the UWAG comments on the November 2000 proposal. See response to comments 316bNFR.368.001 through 316bNFR.368.014 which address the referenced study. In general, EPA finds the energy penalty estimates in the study to be overstated in a manner similar to that explained in the preceding paragraph.

In paragraph 14, the commenter discusses cogeneration efficiency and what it terms the "relative value of energy" (thermal versus electrical). The commenter submitted significant reference material with its comments on the notice of data availability, mostly from Power Magazine, that addresses this subject. Generally, EPA considers the energy conservation measures of cogeneration to be advantageous for all parties and the environment, regardless of the proper method for calculating the relative efficiency of the power project. However, EPA agrees with the statement made in paragraph 15 to the effect that cogeneration projects do not increase the efficiency of the specific power generation cycle. As such, EPA agrees that cogeneration should not be viewed as a means to offset performance penalties of cooling systems.

In paragraph 19 the commenter references a "separate study" that has "presented a detailed cost comparison of wet and dry cooling systems for new combined-cycle power plants," which is another reference to Appendix F to the UWAG comments on the November 2000 proposal. See response to comments 316bNFR.368.001 through 316bNFR.368.014 which address the referenced study. In general, EPA finds the cost estimates in the study to be flawed on several levels. However, the general statement made in paragraph 19 about increased capital and O&M costs for dry cooling over wet cooling is correct.

EPA notes for the record the following statement made by the commenter in paragraph 19: "replacement power needs for the wet system using a mechanical draft tower were negligible." EPA disagrees with this statement to some degree, as EPA has included in the costs of the final rule (which estimates that nine power plants will upgrade their cooling systems from once-through to recirculating wet cooling tower) significant recurring annual costs for replacement of power lost as a result of the moderate energy penalties of wet cooling towers. See Chapter 3 of the Technical Development

Document and Chapter 6 of the Economic Analysis.

In paragraph 19 the commenter concludes the following regarding the comparison "study" (i.e., Appendix F to the UWAG comments on the November 2000 proposal) addressing EPA's proposal cost estimates: "the cooling system capital and O&M cost estimates were underestimated by a factor of from 10 to 100 times." For several reasons, EPA views the commenter's conclusions to be incorrect. See response to comments 316bNFR.368.001 through 316bNFR.368.014 which address the referenced study.

In paragraph 23, the commenter again addresses the subject of cogeneration, reiterating points made in paragraph 14. EPA considers the following statement regarding cogenerated steam to be misleading: "the steam extracted and sold for its heating value reduces the amount of steam available to drive a turbine-generator for the production of electricity." While advanced configurations for steam reintroduction cannot be used in cogeneration activities where steam for heat is required, the commenter's assertion oversimplifies the situation. Exhaust steam from a turbine is at a lower pressure compared to the steam required to efficiently drive a turbine. The ultimate use of this steam does not correspond with the high-pressure steam necessary to drive a turbine. Therefore, although there may be some small efficiency gains foregone by adoption of cogeneration, the magnitude of these losses is not quantified by the commenter.

In paragraph 26, the commenter makes general statements about social and political factors in Europe that drive power plants to install dry cooling plants (i.e., high population density causing reduced water availability and fees for water use in some communities). EPA considered the information, but did not use it as a basis to reject dry cooling. See section V of the preamble for the reasons that EPA rejected dry cooling.

EPA agrees with the following general statement made in paragraph 29 referring to the Tellus report's estimates of dry cooling growth over the period 1985 to 1998: "the [Tellus Institute] source of dry cooling capacity growth is dated 1991, meaning most of the data are estimates and not actual installations." However, EPA points out that the next sentence in the paragraph, which presents actual installed US dry cooling capacity for the period 1995-1999, does not directly compare with the Tellus estimates. Regardless, EPA agrees with the general point of the paragraph, which states in effect that the recent growth in dry cooling is approximately 3 percent, considerably less than the figures quoted by the Tellus report.

EPA disagrees with the final two sentences of the concluding paragraph of Appendix A. EPA disagrees that the report was a distraction to the rulemaking process. EPA also disagrees that the report was an impediment to meaningful dialogue. To the contrary, EPA considers the open exchange of opposing viewpoints and ideas on the subject of dry cooling to be especially enlightening and useful for framing the technology-based performance standards of the final rule.

For the remainder of the response to comment 316bNFR.524.046, see the detailed discussion of the energy penalty comments in response to comment 316bNFR.501.024..

Comment ID 316bNFR.524.047

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Costs of Wet and Dry Cooling Systems

In Part II.G.2 of the NODA, 66 Fed. Reg. 28,866 col. 2, EPA raises a number of issues about the costs of wet and dry cooling towers. UWAG's ability to comment on these issues is limited for two reasons. First, EPA provided a very short comment period that hampered our efforts to comprehensively review EPA's cost assertions. Second, EPA provides an April 23, 2001 memorandum entitled "Supporting Documentation for Unit Cost Analysis" (DCN#: 2-037) ("Supporting Documentation Memo"), in which the Agency apparently intended to summarize and explain conclusions reached from other documents included in an appended list of references; however, the many tables and figures referenced in that memorandum were not included in either the report or other parts of the docket, and in many cases there was no specific cross-reference provided. Thus, it was not possible to fully understand and comment on either the data on which EPA relies or the conclusions it reached.

That being said, UWAG's review found nothing in EPA's new cost documentation that would lead UWAG to question the cost estimates on both wet and dry cooling presented in its November 2000 comments.

EPA Response

EPA rectified the omission of the referenced tables and supporting documents supporting the notice of data availability by adding all the items to the record and extending the comment period by an additional 30 days for these documents.

For a discussion of the commenter's general cost estimate critique of the proposed rule see responses to comments #316bNFR.068.328 through #316bNFR.068.332.

Comment ID 316bNFR.524.048

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

UWAG's comments questioned whether EPA's cost estimates for wet cooling towers, which the Agency said were based on empirical models using actual construction project costs, in fact included all essential costs. UWAG November 2000 Comments, Appendix E, pp. 46-51. EPA says that it now has provided "Supporting Documentation" on these costs and collected additional information to verify its empirical cost models. DCN#: 2-037.

But UWAG's brief initial review of the information EPA has provided suggests, to the contrary, that the values on which EPA relied did not include all essential costs or accurately portray the full costs of wet recirculating cooling. For example, the April 23 memorandum from Bob Fleming of Marley Cooling Tower to Faysal Beckdash of SAIC (DCN#: 2-037-R4) says that Marley's installed costs do not include either pumps or pump modifications, or general contractor overhead and profit. A second document, which consists of a February 7, 2001 e-mail from Robert Burger (whose affiliation is not listed) to Faysal Beckdash of SAIC (DCN#: 2-037-R2), provides a cooling tower cost estimate that does not include materials for or construction of the cooling tower basin (an essential component) or specify whether noise abatement is provided. A third document, which consists of a string of e-mail correspondence between Faysal Beckdash and Gary Mirsky (DCN#: 2-037-R4) provides some cost information for a once-through or "helper" tower at a sea water site, and for a second tower (what type is not clear) at an undisclosed site. That document includes no information on the specific cost components included.<fn18>

EPA's Supporting Documentation Memorandum can be read to concede this point. In the Supporting Documentation Memo, p. 2, EPA says that "[a]dditional documentation from cooling tower vendors on cooling tower construction costs are contained in Table ES-1," but EPA does not provide that table. It then says "[c]ase study costs to account for the estimated construction costs for the missing components (such as pumps or basins)," but ends the sentence without disclosing what sort of analysis it might have done of those missing components or what the cost implications might be. Id.

Other references to which EPA cites appear to support UWAG's capital and operation and maintenance ("O&M") cost estimates. For example, the 1997 Mirsky and Bauthier paper (DCN#: 2-037-R8) presents some data which support the cost comparison of wet and dry cooling systems presented in the UWAG report.

[see original document for table]

EPA Response

For the final rule, EPA has addressed the cases of installed cost estimates, such as those addressed by the commenter, that excluded certain components key to national cost estimates. For example, in the

first example presented by the commenter the installed cost estimate provided to EPA did not account for pumps or contractor overhead and profit. EPA added these cost components to this installed cost estimate before using it in the verification analysis of the final cost equations. In the second example provided by the commenter, it is correct to point out that the cooling tower basin costs were excluded from the installed cost estimate submitted to EPA. The Agency has rectified the situation by adding these costs to the final estimate before including it in the verification analysis. Regarding noise abatement, the Agency's estimates include the appropriate level of noise abatement in this case, even though it was not clearly spelled out in the attachment to the notice of data availability. In the third example, EPA notes that further information on these costs was not provided in the public record of the notice of data availability due to the confidentiality requests of the individuals submitting the information. EPA has verified that all pertinent cost components for the two towers were present before including them in the final verification analysis.

EPA regrets that the Table ES-1 referenced by the commenter was not available at the very beginning of the notice of data availability comment period. However, the omission was quickly rectified by EPA and was provided to the public immediately upon EPA's discovery that it was absent from the record. In addition, the Agency extended the comment period an additional 30 days to allow the public an opportunity to review this document. EPA notes that it received no further comments on this subject from the commenter. The table is included in Chapter 2 of the Technical Development Document. In this Chapter, the sentence at issue states that EPA accounts for the estimated construction costs for the missing components in the above referenced examples before including them in the final cost equation verification analysis, thereby meeting the commenters concerns.

Regarding the commenter's comparative analysis of the 1997 Mirsky and Bauthier data, EPA notes the Agency agrees, generally with the commenter's previously submitted analysis of the ratio of costs of dry cooling systems to wet cooling systems. For a discussion of the commenter's cost estimates see responses to comments #316bNFR.068.328 through #316bNFR.068.332.

Comment ID 316bNFR.524.049

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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UWAG questioned EPA's assumption that O&M costs of wet cooling towers reflect an economy of scale with increasing size. UWAG November 2000 Comments, Appendix F, pp. 48-49. EPA's Supporting Documentation Memo cites Mirsky et al. 1992 and Mirsky and Bauthier 1997 as general sources of information on O&M costs, but does not summarize the conclusions the Agency believes those papers reach or what implications those data may have for EPA's previous analysis. Notably, the memorandum from Bob Fleming to Faysal Beckdash (DCN#: 2-037-R4), which EPA does not cite on this point, appears to document that the rules-of-thumb which EPA frequently presents as the basis for calculating economies of scale are not supportable in practice. That memorandum provides data for three examples. The following analysis of those data demonstrates vividly that rules-of-thumb based on flow rate are not accurate:

	Example 1	Example 2	Example 3
Flow Rate (gpm)	25,000	40,000	50,000
Cost (Tower only)	$6,000,000	$600,000	$1,500,000
Cost (Tower only, $/gpm)	24.0	15.0	30.0
Installed Cost	$12,000,000	$1,700,000	$4,500,000
Installed Cost ($/gpm)	48.0	43.8	90.0

Clearly, factors other than circulating flow rate are important in determining the cost of a wet cooling tower system, and economies of scale are not necessarily straightforward or reliable.

EPA Response

The commenter provides an example, based on information contained in a memorandum from Bob Fleming to Faysal Bekdash (DCN# 2-037-R4), to demonstrate that the rules of thumb used by EPA for calculating economies of scale are not supportable in practice. However, the example provides by the commenter in support of its argument relates to construction costs, and not to O&M costs.

Furthermore, the commenter omits the temperature approaches and construction materials for the three example towers (which was included in DCN# 2-037-R4), which are major drivers of cooling tower construction cost. The temperature approaches for the three example towers are 7 °F (Example 1), 15 °F (Example 2), and 5 °F (Example 3). The temperature approach for Example 2 is significantly higher than that for either Example 1 or Example 3, and thus Example 2 would require a tower less than half the size (per unit flow) of either of the other examples (Marley 1985, Figure 27). In addition, the construction material for Example 2 (wood) is different (less expensive) than the construction material for Examples 1 and 3 (fiberglass). Therefore, Example 2 is not directly comparable to the other example towers.

The temperature approaches for Examples 1 and 3 are roughly equivalent and the construction material is the same, and thus these examples are comparable. However, the commenter's comparison contains the wrong flow rate for Example 1; the commenter presents the flow rate as 25,000 gpm, whereas the correct flow rate (DCN# 2-037-R4) is 250,000 gpm. The commenter correctly calculates the $/gpm costs for the two examples, but the error in flow rate means that the commenter is placing the two examples in the wrong order along the continuum of flows. Example 1 actually belongs above Example 3 on the flow continuum (i.e., Example 1 has a higher flow than Example 3), rather than below Example 3 as shown in commenter's analysis.

When Examples 1 and 3 are placed in the proper order along the flow continuum, the costs per unit flow ($/gpm) make more sense, showing a decline in the tower (only) cost from $30/gpm for Example 3 to $24/gpm for Example 1, and in the installed cost from $90/gpm for Example 3 to $48/gpm for Example 1, as flow increases from 50,000 gpm for Example 3 to 250,000 gpm for Example 1. While Example 1 costs would be expected to increase somewhat if the temperature approach were reduced to 5 °F (as in Example 3), based on Marley 1985 this increase would not be to the extent necessary to make up the difference in costs ($/gpm) between the two examples. Thus, the example towers clearly do demonstrate an economy of scale in cooling tower construction costs (i.e., unit cost ($/gpm) declines as flow rate increases, all other factors being equal).

The commenter summarizes their analysis by stating that "clearly, factors other than circulating flow rate are important in determining the cost of a wet cooling tower system." EPA has always recognized this fact, which is why we have developed separate cost curves for different temperature approaches and construction materials.

See response to comment #316bNFR.068.330 for a discussion of how EPA has revised its cooling tower O&M estimates for the final rule.

Comment ID 316bNFR.524.050

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA assumed that a recirculating cooling tower would use 15% of the flow of a once-through cooling system, which does not match standard industry design practice. EPA says it intends to revise upward its estimates of recirculating flow, but it does not provide any information on what its new assumption will be or what effect that assumption will have on the final cost projection. UWAG agrees that it is essential that EPA make this correction; however, without more details on exactly what EPA plans to do, we are unable to offer specific comments. UWAG would be pleased to work with EPA on this issue going forward.

EPA Response

EPA has based the final recirculating flow estimates on the total cooling flow. See response to comment #316bNFR.039.036.

Comment ID 316bNFR.524.051

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

For other issues raised by the NODA, EPA simply has not provided enough information to allow for assessment and comment. For example, EPA says "[A]t proposal, EPA estimated the marginal annual cost of dry cooling towers over once-through cooling systems but did not explain its methodology for estimating the capital and O&M costs of dry cooling towers. EPA invites comment on the information the Agency used to estimate the annual cost of dry cooling towers placed in the record." 66 Fed. Reg. 28,867 col. 1. But the material EPA has included does not cure the defect for two reasons. First, neither DCN#: 2-037 (the Supporting Documentation Memo) nor any of the other documents it references explain what methodology EPA used to make the calculation. Second, the only discussion of dry cooling costs in the Supporting Documentation Memo refers to tables and figures that are not appended to the memo or otherwise included in the docket. Thus, we have no way of assessing or commenting on the methodology or data EPA used.

Another example involves the inclusion, as a reference listed at the end of the Supporting Documentation Memo, of an undated publication by the U.S. Nuclear Regulatory Commission entitled Nuclear Plant Information Books (DCN#: 2-037-R9). While included as a reference, the excerpts provided are not cited by the Supporting Documentation Memo, nor does EPA say how, if at all, they were used. Additionally, the excerpts, which relate to the Wolf Creek and Callaway Stations, contained insufficient design and operating data on both cooling systems from which to assess or comment on their performance characteristics and the possible meaning of a subsequent comparison.

EPA Response

EPA regrets that several supporting documents for the notice of data availability were not available to the public at the very beginning of the comment period. Once the Agency was aware of the problem, it rectified the situation by including the omitted information in the record to clarify the majority of issues mentioned by the commenter. In addition, the Agency extended the comment period by an additional 30 days for the commenters to analyze the additional information. EPA notes that after the record was corrected and the commenters notified of the extended period, the commenter did not submit further comments on the topics addressed in this comment.

Comment ID 316bNFR.524.052

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Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Other Environmental Impacts

In Part II.G.3 of the NODA, EPA addresses water quality and non-water quality impacts of cooling towers, both wet and dry. EPA intends to estimate the marginal increases in emissions of air pollutants associated with wet and dry cooling towers. 66 Fed. Reg. 28,867 col. 2. EPA suggests two alternative ways of estimating air emissions and requests comments on three particular documents. 66 Fed. Reg. 28,867 col. 3. As explained in Appendix C to these comments, UWAG questions whether either method will result in reliable estimates of increased air emissions.

EPA also should take into account environmental impacts from wet and dry cooling towers other than air pollution. These include increased mortality of entrained organisms, effects on birds, increased noise, use of land, and the potential for salt drift. UWAG discussed these impacts in its November 2000 Comments (pp. 183-88).

EPA Response

For a discussion of air emissions increases due to the final rule see Chapter 3 of the Technical Development Document.

For a discussion of mortality of entrained organisms in different cooling systems see response to comment 316bNFR.068.072.

For discussion of other environmental impacts or side-effects of cooling towers see responses to comments 316bNFR.014.019 and 316bNFR.068.100.

Comment ID 316bNFR.524.053

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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Baseline Biological Characterization Study

In Part II.G.4 of the NODA, EPA requests comment on its proposed requirement for a "source water baseline biological characterization" based on at least one year of pre-operational biological monitoring. EPA notes that UWAG and EPRI, among others, already have commented that EPA has underestimated the costs of biological monitoring. 66 Fed. Reg. 28,868 col. 1. EPA has revised its cost estimates and believes that it should use cost ranges that, for the source water baseline characterization and entrainment monitoring, vary for different types of waterbody. EPA's revised cost estimates are as follows:

[see original document for table]

EPA Response

EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicant must conduct a considerably more rigorous study if they seek to demonstrate that alternatives to the Track I requirements will equivalently reduce impingement and entrainment at a site. EPA has revisited and revised the cost estimates for monitoring based on revisions to the final rule, and those costs are documented for the record in the NODA. EPA recognizes that the actual costs will differ from site to site, depending on the rigor of the sampling effort or study. EPA believes that the commenter's estimated costs are based on past experience where comprehensive multi-year studies were conducted. EPA has placed bounds on the sampling effort and has based its revised costs on current contracting rates for this activity. See the ICR.

In setting Comprehensive Demonstration Study requirements, EPA recognizes that it is important to require studies that are intensive enough to provide useful information, yet not so intensive as to be unnecessarily open-ended, time-consuming or costly. The Source Water Biological Study required by the rule in Track II is not excessive or open-ended, and in EPA's view, represents the minimum level of data necessary to: a) determine the kinds, numbers, life stages, and duration of aquatic organisms in the vicinity of the cooling water intake structure; and b) allow a determination of whether the proposed or installed suite of technologies will reduce impingement and entrainment to a comparable level as Track I. The design of these requirements factor in two primary points identified by many commenters, i.e., the site-specificity and natural variability of the distribution of aquatic organisms. The Comprehensive Demonstration Study design recognizes that there is a great deal of natural variability in the distribution of aquatic organisms due to many physical/environmental factors including tidal currents, diel fluctuations in organism behavior, meteorological changes, seasonality, and salinity changes. EPA believes that the robust study required in the rule is necessary to capture changes over time, yet is at a level that should not be unduly time-consuming or costly. EPA also believes that verification monitoring is essential to the integrity of the rule to ensure that applicants who commit to meeting performance comparable to Track I fulfill that commitment and to ensure fairness to facilities that commit to Track I requirements. These studies will allow the facility and the permit writer to assess the efficacy of the technologies on a site-specific basis and determine whether additional or other technologies or operational measures would be required to meet the Track I standards.

Comment ID 316bNFR.524.054

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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Delays

For a variety of reasons, a 12-month baseline biological characterization study is likely to be more expensive, complex, and lengthy than would at first appear:

-Twelve months' time may not provide enough data to draw any real conclusions about the populations and species present on the waterbody and what impacts the proposed project may have, because of natural variability in species distribution and population due to climatological and other factors.

-Depending on when the company needs to begin a 12-month study, it might be studying the end of one life-cycle year and the beginning of the next, and consequently not obtaining a complete understanding of the dynamics of the studied populations.

-Although the States and other entities that track fisheries populations may already have considerable data that can be used, the company may have to collect considerably more data.

-Any plan of study should be developed in cooperation with and approved in advance by the state permitting agency. This could add three to six months to the development time before the studies could even begin.

-Biological monitoring does not include just field work, but also data analysis, ecological risk assessment, and report preparation. These activities could take three to six months following the conclusion of the field work. And this does not take into consideration the amount of time needed by the agency to review the report and results; sometimes the agency hires a contractor to review the permit applicant's study, and merely getting the approvals to do so can require a long time.

Thus, EPA's proposed 12-month study period actually will set in motion a chain of events that will take much longer and lead to significant delays in permitting new facilities. More realistically, the monitoring will require 18-21 months and will not begin until other permitting activities are well underway. The delay in building a much-needed power plant caused by such a requirement could result in projects losing their position in the "queue" of projects being considered for approval by electricity interconnection companies and could result in regional power shortages in areas where electricity reserves are already low.

Some commenters, EPA says, have argued that one year of pre-operational monitoring may not be enough, especially in oceans. EPA seeks comments on what an appropriate monitoring period should be. As with many aspects of determining AEI, the extent of monitoring needed will depend on site conditions and should be established on a site-specific basis. Further guidance from EPA on this issue is undoubtedly needed. Such guidance should take into account the availability of other existing

information, including fisheries resource data, biocriteria studies, previous § 316(b) studies of population and community status, and any other information that may be available.

EPA Response

See response to comment 316bNFR.524.053.

Comment ID 316bNFR.524.055

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Subject Matter Code 19.2

Baseline Biological Characterization Study

Costs

Moreover, UWAG believes, based on experience with actual biological studies, that EPA has greatly underestimated study costs. The Big Bend Station, to name just one example, did a study that cost about $600,000.

EPA Response

See response to comment 316bNFR.524.053.

Comment ID 316bNFR.524.056

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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Consider also the experience of Conectiv. Conectiv has § 316(b) studies underway at two plants, the Edge Moor Power Plant ("EMPP") on the Delaware River and the Indian River Power Plant ("IRPP") on the Indian River estuary off the Atlantic Ocean in southern Delaware. The studies, both 24 months in duration, were designed, at the request of the state agency's Fisheries Management Department, to begin in the fall of the study year in order to cover two complete "life cycles." About two-thirds (66%) of the cost of the studies are for waterbody population studies, even though the company's data were supplemented by a considerable amount of data collected in other § 316(b) studies and state trawl surveys.

Actual costs for two year-long § 316(b) studies at the Conectiv plants (field work only) were as follows:

EMPP (river): $826,000
IRPP (estuary): $655,000

The difference between these two costs is primarily due to the extent of the population studies required. (The area of the estuary for which the population studies were required was less than the area of the river.) Trawl data were available from fisheries groups for both locations. No ichthyoplankton data were available from the state agency for either site. The scope and study plan were developed in cooperation with the state agency.

These costs do not include the costs incurred by the contractor responsible for the study design, project management, field contractor oversight, data analysis, ecological risk assessment, report preparation, or agency negotiations. These typically add 40-50% to the cost of the studies, and an assumption of 45% additional would be reasonable. Taking all this into consideration, based on the costs for Conectiv studies actually underway, the costs for a 12-month study that might be required for permitting a new facility at these locations would be:

EMPP (river): $395,000
IRPP (estuary): $313,000

This would add considerably to the $500,000 to $750,000 it typically takes to permit a new facility (combined-cycle plant with wet cooling towers) from beginning to end.

EPA Response

See response to comment 316bNFR.524.053.

Comment ID 316bNFR.524.057

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Subject Matter Code 19.2

Baseline Biological Characterization Study

At another plant in the Southeast, the annual cost to conduct and report fish community monitoring (Reservoir Fish Assemblage Index sampling) upstream and downstream of individual plant intakes is estimated to be around $25,000. The operators of that plant estimate that, if § 316(b) studies were conducted today at the same level of effort as in the 1970s, the cost would be in the neighborhood of $350,000 for fisheries work and an additional $100,000 for benthic macroinvertebrate sampling and reporting.

EPA Response

See response to comment 316bNFR.524.053.

Comment ID 316bNFR.524.058

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Subject Matter Code 19.2

Baseline Biological Characterization Study

Another company, based on extensive experience, estimates that one year of biological studies would cost $100,000 to $350,000 for work on rivers and $500,000 to $1,500,000 for work on the Great Lakes.

EPA Response

See response to comment 316bNFR.524.053.

As another example, PSEG is conducting biological monitoring on a tidal river in the Northeast, the costs of which greatly exceed the estimates EPA has provided. In this 15-week program, PSEG is conducting weekly entrainment sampling and ichthyoplankton river surveys (net tows in two locations). The cost for sampling and laboratory analysis is approximately $200,000, which includes all equipment and manpower to implement the program.

PSEG also provides the following summary of the scope and cost of four biological monitoring programs:

Example 1. Scope and cost of biological studies conducted in 1998 and 1999 for a plant located on a tidal river in New Jersey:

Entrainment - 26 sampling events (24 hours each), conducted every two to four weeks
Impingement - 34 sampling events (24 hours each), conducted every two weeks
Plankton abundance - 9 sampling events (24 samples each), conducted every two to four weeks
Bottom trawling - 22 sampling events (12 samples each), conducted every two weeks
Surface trawling - 14 sampling events (12 samples each), conducted every four weeks
Beach seine - 14 sampling events (4 samples each), conducted every four weeks
Benthic macroinvertebrates - 4 sampling events (12 samples each)

The total cost for this work was approximately $300,000 for fieldwork and lab analysis and $100,000 for data analysis and reporting.

Example 2. Scope and cost of biological studies conducted in over 12 months in 1996 and 1997 for an estuarine plant in New Jersey:

Entrainment (ichthyoplankton) - 104 samples
Entrainment (zooplankton) - 52 samples
Intake vs. discharge comparison (ichthyoplankton) - 16 samples
Impingement - 62 samples
Tucker trawls - 657 samples
Mid-water trawls - 60 samples
Pelagic trawls - 111 samples
Centerline water quality survey - 99 samples
Benthic survey - 69 samples

The total cost for this work was approximately $ 530,000 for fieldwork and lab analysis. Data analysis and reporting were combined with other costs and cannot be easily separated.

Example 3. Scope and cost of biological studies for an estuarine plant in the northeast (15-week program currently being conducted):

PSEG is conducting weekly entrainment sampling and ichthyoplankton river surveys (net tows in two locations). The cost for sampling and laboratory analysis is approximately $200,000. This cost includes all equipment and manpower to implement the program.

Example 4. Scope and annual cost of biological studies conducted for an estuarine plant in New Jersey. Impingement and entrainment sampling would be required year-round.

Impingement: $190,000. 1-3 days/week; 4-12 samples/day; 24-hour sampling.
Entrainment: $375,000. 3 days/week August-March (24 samples/week); 5 days/week April-July (60 samples/week); 24-hour sampling; 4-12 samples per day.
River Ichthyoplankton: $350,000. 130 river miles; 2/month April-July; 90 samples/event; $260/sample for laboratory analysis.
Bottom trawl: $170,000. 130 river miles; 1/month April-November; 70 samples/event.
Pelagic trawl: $160,000. 130 river miles; 2/month July-October; 70 samples/event.
Beach seine: $100,000. 73 river miles; 2/month July-October; 1/month June and November; 40 samples/event.

Note: All costs are inclusive of management oversight, data entry, QA/QC, and a non-interpretive report. Impact assessment model runs and ancillary interpretive analyses add approximately 15% to the field costs.

EPA Response

See response to comment 316bNFR.524.053.

Comment ID 316bNFR.524.060

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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As a final example, a closed-cycle facility on the Great Lakes conducted entrainment and impingement studies in 1991-92. Entrainment samples were collected with two trash pumps over a 24-hour period once a week from April through August, twice per month in March and September, and once per month the rest of the year. Impingement samples were collected over a 24-hour period once per week for 12 months. In addition to entrainment and impingement sampling, three intake current velocity profile surveys were conducted.

Costs for entrainment, impingement, and current velocity profile studies were approximately $71,000, $16,000, and $9,000, respectively. These costs included field labor, equipment, data analysis, and report preparation. (Data analysis and report preparation were apportioned to each field activity based on a cost weighting of these activities.) If these costs are adjusted for inflation, the current costs of the entrainment, impingement, and current velocity profile studies would be approximately $90,300, $20,400, and $11,450, respectively. Thus the entrainment monitoring costs are well above EPA's estimate for lake/reservoir entrainment monitoring and even above its estimate for ocean entrainment monitoring. The inflation-adjusted cost of impingement studies is within EPA's estimate for lake/reservoir impingement monitoring, but the CWIS at this facility was relatively small because of the closed-cycle cooling.

EPA Response

See response to comment 316bNFR.524.053.

Comment ID 316bNFR.524.061

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Subject Matter Code 19.2

Baseline Biological Characterization Study

DOE, in its comments on the NODA, notes that the expert panel at EPA's May 23, 2001 Experts Panel meeting corroborated the view that the costs assumed by EPA for baseline characterization studies were seriously underestimated. DOE recommends that EPA talk to utilities or contractors to better estimate study and monitoring costs based on actual experience.

EPA Response

See response to comment 316bNFR.524.053.

Comment ID 316bNFR.524.062

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Subject Matter Code 19.2

Baseline Biological Characterization Study

The cost of a biological study depends, of course, on the thoroughness and extent of the study. The more information that is gathered, the higher the cost. At the same time, the cost of collecting too little data can also be very high, since a false impression that AEI is occurring may cause the regulatory agency to require costly modifications to the intake structure or even installation of cooling towers (though UWAG contends that cooling towers cannot be required legally under authority of § 316(b)). Accordingly, it is quite likely that power plant operators will spend more money than EPA is now estimating, possibly even oversampling in an effort to avoid "false positives" that might appear to show AEI.

EPA Response

EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicant must conduct a considerably more rigorous study if they seek to demonstrate that alternatives to the Track I requirements will equivalently reduce impingement and entrainment at a site. EPA has revisited and revised the cost estimates for monitoring based on revisions to the final rule, and those costs are documented for the record in the NODA.

Comment ID 316bNFR.524.063

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Subject Matter Code 10.16

Two Track Process

DOE "strongly supports" the type of framework embodied in the Two Track approach, according to DOE's comments on the NODA. DOE feels that the value and efficacy of this approach would be limited, however, if EPA "piles on" too many additional requirements, as is contemplated in the NODA, on p. 28,870.

EPA Response

See response to comment 316bNFR.501.004 and the preamble to the final rule.

Comment ID 316bNFR.524.064

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Subject Matter Code 10.16

Two Track Process

As UWAG's comments above show, we believe the Two Track approach as we have outlined it above is environmentally protective, administratively efficient, and offers the best and most defensible means of implementing § 316(b) for new facilities. UWAG does not believe that the many "modifications" EPA has under consideration are either necessary or appropriate. In many cases, they would add little or no meaningful incremental environmental benefit, but they would substantially increase costs and decrease flexibility and efficiency. Therefore, for the reasons discussed below, we urge EPA to pursue the Two Track approach without these unnecessary and counterproductive modifications.

EPA Response

EPA disagrees. See preamble section V.D for a discussion on why EPA is not accepting the industry two-track approach in full.

Comment ID 316bNFR.524.065

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Subject Matter Code 10.16

Two Track Process

II.I. Adding Proportional Flow Limits and/or Fine Mesh Traveling Screens With Low Pressure Wash and Fish Returns or Wedge Wire Screens

The first modification suggested by EPA is to use a "suite of technologies" for the Fast Track option. 66 Fed. Reg. 28,870 col. 1-2.

The technologies under consideration are reduction in capacity commensurate with that of a closed-cycle cooling system; a velocity limitation less than or equal to 0.5 ft/s;<fn19> and location where intake capacity would be no more than 5% of the mean annual flow or 25% of the 7Q10 flow of a freshwater stream or river, or 1% of the tidal excursion volume of a tidal river or estuary, or where the intake capacity would not disrupt the natural stratification and turnover patterns of a lake or reservoir.<fn20>

UWAG does not believe that EPA should add this additional proportional flow requirement, for several reasons. First, there is no reason to believe that such an additional limit is necessary in order to achieve the objectives of the Two Track approach, which is to be highly protective, if not overly protective, in the vast majority of cases. Second, the selection of an appropriate proportional flow "limit" (as opposed to a screening level that leads to further inquiry, as under Track 2) would be highly site-specific and would depend on many factors, including the life history of the species affected and the status of the population that could be affected. UWAG does not believe that EPA could reasonably develop a proportional flow limit that would be defensible and would not risk undercutting the application of Track 1 to otherwise appropriate cases. Third, in those few cases (if any) where the permit writer has information suggesting that the proportion of the flow to be withdrawn is likely to create an appreciable risk of AEI, the better solution would be to use Track 2, which provides a far more defensible means of setting a proportional flow limit, than to impose a generic proportional flow restriction on Track 1.

If EPA were to include as part of the highly protective option a proportional flow limit in addition to the intake flow and velocity components, it would have to be set at a realistic level. As already noted, the 5% flow criterion in Track 2 is very conservative, indeed more conservative than necessary to protect many species and populations.

EPA Response

EPA disagrees. The flow proportional limit is a technically available and economically practicable requirement that safeguards the integrity of smaller streams. In combination with the other requirements it constitutes best technology available for minimizing adverse environmental impact. See today's preamble section V for a discussion of the basis of today's requirements.

Comment ID 316bNFR.524.066

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Subject Matter Code 10.16

Two Track Process

EPA also says that, in addition to imposing a proportional flow limit, it is considering requiring additional technology such as fine mesh traveling screens with low pressure wash and fish returns or wedge wire screens. 66 Fed. Reg. 28,870 col. 2.

UWAG believes that such an additional technology requirement is wholly unnecessary. Enough information has accumulated by now to show that wet cooling towers with an intake velocity limitation of 0.5 ft/s are highly protective, so much so that they would avoid AEI at almost any site in the United States. Moreover, a vague additional technology requirement would undercut the time- and cost-saving benefits of the Track 1 approach, because the selection of additional technologies for site-specific concerns is inherently site-specific. In the very small handful of cases where a site is so sensitive that the Track 1 technology may not avoid AEI, the permit applicant should use Track 2 instead of Track 1. Track 2 is flexible enough to permit: (1) further evaluation of whether AEI is occurring, using Track 2 screening tools or studies; (2) evaluation of candidate technologies as BTA; or (3) simply installing a technology to protect the species of concern. Because Track 2 is so flexible, it is not necessary to load up Track 1 with restrictions to account for every imaginable site-specific problem.

EPA Response

EPA disagrees. The additional requirements in today's rule (required under certain circumstances) are part of the 316(b) requirement that the best technology available to minimize adverse environmental impacts are employed. See preamble section V for further discussions on EPA's analysis of the technologies and why it has decided to require them under certain circumstances.

Comment ID 316bNFR.524.067

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Subject Matter Code 10.16

Two Track Process

Should Dry Cooling Be an Accepted "Fast Track Technology?"

EPA also asks whether it should, as part of the "Fast Track," require dry cooling at all locations, on certain sensitive waterbodies, in regions where dry cooling is demonstrated or at facilities of a certain size where dry cooling is particularly well demonstrated. 66 Fed. Reg. 28,870 col. 2-3.

DOE in its comments on the NODA opposes any attempt to require dry cooling in a national rule. This highly costly technology, DOE says, is costly and increases energy consumption; it should be required only after a site-specific evaluation.

UWAG agrees that EPA should not include dry cooling towers as one of the approved technologies for the Fast Track. As UWAG said in Section X of its November 2000 Comments, dry cooling neither is necessary to minimize AEI nor qualifies as BTA.

EPA Response

EPA has not included dry cooling as best technology available in today's final rule. See preamble section V.C for a discussion on why EPA is not adopting dry cooling as the best technology available for minimizing adverse environmental impact. However, dry cooling, should it be chosen by a facility as the technology to be installed to comply with today's rule, would be considered an acceptable fast track technology.

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Subject Matter Code 10.16

Two Track Process

Should the Fast Track for Estuaries Be Different From the Fast Track for Other Waterbodies?

Another modification EPA says it is considering would involve imposing differing suites of Fast Track technologies based on the type of waterbody or the facility's location within the waterbody (e.g., additional Fast Track technologies in tidal rivers and estuaries over those required in the parts of oceans, freshwater rivers and streams, and lakes and reservoirs that may be designated as less sensitive).

As a general matter, the proposed Fast Track technologies (essentially those equivalent to wet cooling towers plus an approach velocity limit of 0.5 ft/s) are adequate for estuaries as well as for other types of waterbodies.

As discussed above, EPA's limited data do not show that all areas in all estuaries are more "sensitive" to CWIS impacts than are other types of waters. Thus, the Agency has no reasonable basis for imposing additional across-the-board requirements for facilities located on such waters. Equally important, such an approach effectively would render Track 1 useless for facilities sited on such waters. As EPA is well aware, any additional "design and construction" technologies would have to be identified after consideration of site-specific factors, including the species and life stages to be protected and the physical attributes of the waterbody. The analyses needed to identify the technology that would maximize net benefits take time; the resultant delay effectively would negate the value of the "Fast Track." Moreover, facilities that need to perform such analyses may well be able to show that the alternative(s) they identify render the restrictive flow value unnecessary. Thus, requiring both very low flow and additional fish protection technologies is merely redundant.

Even if there are a small number of cases in which some additional fish protection technology might be warranted for a site (whether estuarine or otherwise) that is known to be particularly sensitive, it would be more appropriate to deal with those situations by establishing a procedure that requires permit writers to give developers early warning that they are required to follow the Track 2 approach.

EPA Response

EPA does not distinguish between waterbodies in terms of the requirements of this rule. See response to comment 316bNFR.047.001. EPA notes that today's two track, technology based rule also authorizes additional requirements under certain circumstances in order to protect those areas that may warrant such protection. Finally, permitting authorities may also use their own authorities under section 401 and 510 of the Clean Water Act to require additional technologies reasonably necessary to comply with any provision of state law, including compliance with applicable state water quality standards, designated uses, criteria and antidegradation requirements. See 40 CFR 125.84(e).

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Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

Are the Fast Track Technologies "BTA"?

The highly protective Fast Track technology is not "best technology available" as that term is used in § 316(b). The Fast Track approach calls for simply committing to a highly protective technology, on the ground that such a technology has been proven to be protective in almost any environment. The analysis does not call for determining whether AEI would have occurred without a technology. Conceptually, then, a highly protective Fast Track technology is not the same as "BTA."

Also, a Fast Track commitment to the highly protective technology involves no consideration whatsoever of cost or economic practicality, such as would be required for BTA under § 316(b).

EPA Response

EPA has discussed why it has not adopted the industry two-track approach in full in the preamble to the final rule. EPA finds it reasonable to interpret section 316(b) of the CWA to allow it to establish technology-based performance requirements rather than addressing section 316(b) by first asking whether there are effects on the receiving water. See responses to comments 316bNFR.068.007, 316bNFR.068.008 and 316bNFR.206.014.

The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires under specified conditions the permit applicant to select and implement design and construction technologies to minimize impingement mortality and entrainment of all life stages of fish and shellfish. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will achieve a level of performance comparable to track I. Track II also requires the applicant to meet the same proportional flow requirements that apply in Track I. These BTA requirements have been determined to be economically practicable on a national basis.

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Subject Matter Code 10.1

Request for Comment: Rebuttable Presumption Approach

Determining What Technologies are Comparable to the Fast Track Highly Protective Technologies

EPA asks for comments on whether wedge wire screens are comparable to closed-cycle cooling. EPA also asks how a regulator would determine if alternative technologies are comparable to the basic Fast Track technology, which is wet closed-cycle cooling with a 0.5 ft/s intake approach velocity limit.

In determining whether a given technology, such as a wedge wire screen or fine mesh traveling screen with fish return, will perform within the same general range, EPA needs to take into account that the performance of all technologies, even cooling towers, will vary from "design" conditions with ambient and operating conditions. Thus, any reasonable approach to comparing technologies must take into account not only expected avoidance of entrainment and impingement, but differences in survival rates and some reasonable amount of variation. For example, if a wedge wire screen located in a freshwater river were capable of reducing entrainment by 85%, and the survival rate for those organisms that were entrained was 50%, the system overall would provide environmental protection of 92% of the organisms potentially affected. This would compare favorably to EPA's projected reduction in entrainment by a wet recirculating tower, which ranged from 96-98% (assuming the even distribution of entrainable organisms).

Given the environmental side effects associated with closed-cycle cooling (particularly in terms of energy penalties, incremental increases in air emissions, noise, consumptive water use, and fuel use) and the de minimis effect, if any, such a small percentage difference would have on most populations, UWAG believes that the wedge wire screen performance would fall within the same general range as the wet recirculating system.

Additionally, EPA has commissioned studies by EPRI to provide more data than now exist on the performance of wedge wire screens. Undoubtedly, other information about the performance of various technologies will come to light in the months and years ahead. Accordingly, EPA should set up a process to allow accumulating information on the performance of intake technologies to be considered in permit proceedings and a decision on new Fast Track technologies to be made expeditiously, so as to provide regulatory certainty early in the process.

EPA Response

The final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions

of certain waterbodies (referred to as “proportional-flow requirements”). It also requires under specified conditions the permit applicant to select and implement design and construction technologies to minimize impingement mortality and entrainment of all life stages of fish and shellfish. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will achieve a level of performance comparable to track I. Track II also requires the applicant to meet the same proportional flow requirements that apply in Track I. These BTA requirements have been determined to be economically practicable on a national basis.

Under this approach, new facilities have flexibility to use a wide variety of technologies to achieve performance comparable to Track I. In addition, the final Track II requirements provide some flexibility for facilities to seek alternative requirements where, when pursuing compliance under Track II, air emissions or energy impacts that would result from compliance with Track I are significantly greater than those EPA considered in establishing the requirements. Finally, under Track II, use of the term comparable level of performance does provide some flexibility to account for the challenges presented in comparing technology performance.

For more information on the specific technologies, please refer to the Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities. Specifically, for more information on wedgewire screens technologies, please see Chapter V.

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Subject Matter Code	10.16
	Two Track Process

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II.N . Should There Be Less Monitoring Required for the Fast Track?

EPA asks whether permit writers should be authorized to require pre-operational monitoring even for the Fast Track, in special cases such as multiple intakes, that may present concerns about cumulative impacts. 66 Fed. Reg. 28,870 col. 3. EPA also contemplates the possibility of requiring limited pre-operational monitoring for all new facilities at the time of year of highest egg and larval abundance.<fn21> Id. EPA also says it is considering requiring the permit to contain some or all of the proposed operational monitoring requirements at proposed 40 C.F.R. 125.87, 65 Fed. Reg. 49,121, or a reduced frequency of operational monitoring requirements. Further, EPA asks whether it should permit state officials the discretion to require pre-operational studies under circumstances similar to those described in proposed 40 C.F.R. 125.84(f) and/or proposed 40 C.F.R. 125.84(g). For example, the Director might require pre-operational monitoring if he or she determines it is reasonably necessary as a result of the effects of multiple CWISs in the same body of water or it is reasonably necessary to ensure attainment of water quality standards.

As for even limited pre-operational monitoring, EPA should not require it in addition to installing highly protective Fast Track technology. Requiring pre-operational monitoring would impose delay, and it would provide little or no useful data, since it would be of limited duration. Equally important, that delay would provide a disincentive to follow Track 1, thus reducing environmental protection and the administrative efficiency of this approach, for little or no environmental gain.

As for monitoring after a facility has begun operating, in light of the fact that the facility has highly (and often overly) protective technology, monitoring would be warranted only as necessary to confirm that the technology is performing as designed. For example, some monitoring after operation might be justified to determine whether a velocity cap is achieving the designated velocity or whether a wedge wire screen is achieving its design specifications.

EPA Response

Today's final rule contains verification monitoring requirements which will determine if the technology employed is performed as designed. Today's final rule requires pre-operational monitoring only under Track II where site specific concerns are taken into consideration. See section V for discussions on the basis of today's rule and section VII for discussions on implementation of this two track approach.

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Subject Matter Code 10.16

Two Track Process

Should Permit Writers Have the Authority to Revisit the Fast Track?

EPA also asks whether the approach should be modified to allow the permit writer to retain authority to revisit § 316(b) requirements at permit renewal, based on the facility's impingement and entrainment monitoring data or other new information.

For the reasons discussed above, UWAG does not believe that facilities that commit to achieve low flows and velocities should be required to perform entrainment and impingement monitoring. Those facilities that commit to installing other highly protective technologies that perform within the same range as cooling towers should be required to monitor for a reasonable period of time where necessary to show that the technology is working as anticipated. UWAG submits that the plants willing to commit to the highly protective "Fast Track" technologies, and those technologies are performing as anticipated, should be freed of new § 316(b) requirements for the life of the facility (except in the three exceptional circumstances listed in Section I above).

EPA Response

Today's rule contains requirements that will allow the permit writer to revisit the permit in subsequent permit renewals. See 40 CFR 125.89(a)(2). See preamble section V and section VII for discussions on the basis for today's rule and for discussion on implementation issues.

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Subject Matter Code	10.16
	Two Track Process

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EPA's Consideration of Modifications to the Track 2 Option

EPA also asks for comments on, and is considering a host of modifications to, the Track 2 approach. Following are UWAG's comments on the issues EPA has raised.

1. Biological Studies

First, EPA is considering requiring a Track 2 facility to conduct a site-specific study that would meet at a minimum the proposed requirements for a one-year source water baseline biological characterization as proposed or, alternatively, for oceans, tidal rivers, and estuaries, a longer study.

UWAG opposes a requirement that would impose a uniform biological study on all sites. Exactly what should be required depends upon the availability and nature of any pre-existing data (including past § 316(b) studies and fisheries management reports), the nature of the waterbody and its variability, the location and life-cycles of potentially affected species, the likely means of analyzing the information,<fn22> and many other factors. Rather than pursuing a one-size-fits-all monitoring approach, UWAG believes that both the environmental and administrative efficiency would be better served if EPA were to give permittees and permit writers guidance on the basic elements of a well-planned and conducted study and how to select among options for analyzing the available data.

EPA Response

In today's rule, EPA has simplified the Track I information requirements. In Track II EPA requires that a Comprehensive Demonstration Study be prepared. The facility may use existing data, if it is not older than 5 years, and must demonstrate that the existing data are sufficient to develop a scientifically valid estimate of potential impingement and entrainment impacts, and provide documentation showing that the data were collected using appropriate quality assurance/quality control procedures. See 40 CFR 125.86(c)(2). See also preamble section V and section VII. EPA is concerned that these Track II facilities demonstrate in a sound manner comparability with Track I requirements. As many commenters have constantly said throughout this rulemaking, impingement and entrainment is highly variable; thus one year of data is not sufficient to ensure that the permit authority has an adequate basis to judge comparable performance.

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Subject Matter Code 10.16

Two Track Process

Screening Levels

Second, EPA is considering different screening levels for entrainment assessment. Track 2 of the Two Track approach suggests a value of 5% or less of the 90% exceedance flow of a river or 5% or less of the volume of the biological zone of influence in a lake or reservoir, measured when entrainable life stages of representative indicator species are present. EPA is considering providing that an applicant would not have to assess potential entrainment impact if an intake structure withdraws a proportion of waterbody flow or volume significantly less than any final limitations for proportional flow, such as EPA's proposed criteria of no more than 5% of the mean annual flow or 25% of the 7Q10 flow of a freshwater river or stream. 66 Fed. Reg. 28,871 col. 1. EPA is considering screening levels between 1% and 50% of any final proportional flow limitations. 66 Fed. Reg. 28,871 col. 1-2.

EPA also invites comment on a possible screening level for entrainment based on the total intake flow at a facility. EPA is considering a range of 2 MGD to 15 or 25 MGD.

EPA is further considering modifying the Track 2 approach to require that entrainment should be assessed if it exceeds either a flow-based threshold or a threshold based on equivalent-adult losses. EPA is considering requiring entrainment assessment above a threshold as low as 1% or as high as 50% of those organisms that occupy or pass through the area from which source water moves into the intake. Alternatively, EPA might use the 1977 Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment to focus entrainment assessment on the "primary study area," "the secondary study area," or the "zone of potential involvement." EPA is considering a range of 1% to 5% as a quantitative screening requirement in conjunction with any of these definitions. 66 Fed. Reg. 28,871 col. 3.

EPA's first alternative, requiring an applicant to meet both a flow-based and a population-based screening criterion (66 Fed. Reg. 28,871 col. 2), would place an excessive burden on applicants without appreciably reducing the degree of uncertainty concerning the risk of AEI posed by an intake structure. UWAG's proposed proportional flow criterion is more conservative than EPA's proposed intake flow limit (DCN#: 2-043) and is sufficient to ensure that no appreciable risk of AEI is present. An alternative population threshold criterion is needed only for situations in which the flow criterion cannot be met.

EPA's second alternative, defining a population threshold criterion in terms of the percentage of organisms passing through or occupying the area from which water moves into the intake, is vague and in some cases may actually be insufficiently protective. If the phrase "area from which water moves into the intake" is intended to refer to the withdrawal zone of the intake structure, then this alternative is nonsensical because 100% of the water present within this zone will eventually be withdrawn. If the phrase refers to some larger area, then the boundary of that area must be specified.

The most meaningful approach would be to define the boundary in terms of the area occupied by vulnerable populations. Even if the area is defined in a biologically meaningful way, the proposed approach is still flawed because it would focus the criterion on the most numerically abundant species and life stages, i.e., eggs and larvae of pelagic-spawning species. Other life stages and species may be more important from the perspective of AEI. UWAG's recommended approach avoids this problem by expressing the criterion in terms of "equivalent adults," a measure that weights different life stages according to their probability of surviving to contribute to the adult population, and that focuses the assessment on specific species of interest.

EPA's third alternative, basing a criterion on concepts drawn from the 1977 Draft Guidance, appears sound in principle, but it is not clear how EPA plans to translate the relatively general concepts described in the guidance document into a population threshold criterion that is explicit enough to be used by applicants and regulatory agencies.

UWAG continues to believe that the proposed 1% and 5% thresholds are appropriate and conservative. The 1% loss of recreational and commercial species, expressed as equivalent adults, is only a very small fraction of the annual harvest of these species, which can be as much as 40% or even 50% per year. A reduction of 1% or less is also substantially smaller than the measurement error in estimates of adult population size and fishing mortality rates in harvested species. A 5% threshold for nonharvested species is appropriate because these species are not subjected to fishing mortality and, therefore, should be less susceptible to adverse effects related to cooling water withdrawals.

EPA Response

See preamble section V for discussions on the basis of today's requirements. EPA has rejected a population approach for the new facility rule for the reasons discussed elsewhere in this comment response document. For new facilities, EPA believes that the final rule's approach is technically and economically achievable and that it is simply and fairer to implement nationwide.

Comment ID 316bNFR.524.075

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

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The “Maximize Net Benefits” Approach

EPA comments on the UWAG recommendation that, under Track 2, the applicant would perform a benefit-cost analysis to determine which technology would “maximize net benefits.” 66 Fed. Reg. 28, 871 col. 3. EPA contends that the industry approach does not define how to maximize net benefits. EPA also invites comments on three issues related to such site-specific benefit-cost analyses:

1. Whether it would be appropriate to ensure that such site-specific cost-benefit studies include assessments of certain data and ecological risks.

2. Whether such benefit-cost studies should be based upon single-year or multiple-year baseline.

3. Whether EPA should use the “wholly disproportionate” cost-benefit test or one of the economic affordability tests described in the proposal.

In this section, UWAG defines how to use cost-benefit analysis to maximize net benefits. This section also addresses the above three issues.

EPA Response

This comment references issues that will be raised in subsequent comments:

•For a response to the issue of whether it would be appropriate to ensure that such site-specific cost-benefit studies include assessments of certain data and ecological risks, please see the response to comments 316bNFR.524.080, 316bNFR.524.081, and 316bNFR.524.082.

•For a response to the issue of whether such benefit-cost studies should be based upon single-year or multiple-year baseline please see the response to comment 316bNFR.524.083.

•For a response to the issue of whether EPA should use the "wholly disproportionate" cost-benefit test or one of the economic affordability tests described in the proposal please see the response to comment 316bNFR.524.084.

•Finally for a response to the commenter's definition of how to use to use cost-benefit analysis to maximize net benefits please see the response to comment 316bNFR.524.076.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Outline of Methods to Determine the Fish Protection Alternative that Maximizes Net Benefits

This section outlines the general methods that UWAG recommends for determining the fish protection alternative that would maximize net benefits (i.e., benefits minus costs). This section draws on previous materials that have been provided to EPA, including a recent report prepared for UWAG by National Economic Research Associates, Inc. ("NERA Report") with contributions by others. Economists and other analysts have developed well-established procedures to evaluate the benefits and costs of alternatives. The appropriate cost-benefit procedure can be summarized by the following process:

1. Identification of alternatives. Identify fish protection technology alternatives for the specific site, including feasible combinations of technologies.

2. Cost and benefit valuation. Develop information on the expected costs and expected benefits of each alternative, expressing the elements as dollar values to the extent feasible.

3. Organization of alternatives. Arrange the alternatives in terms of increasing expected costs.

4. Incremental analyses. Calculate the incremental costs and incremental benefits of each alternative.

5. Identification of the best alternative. Identify the alternative – which could include a combination of technologies – that has the greatest net benefits (i.e., benefits minus expected costs).

6. Uncertainty analyses. Identify uncertainties and elements that cannot be put in dollar terms and the range of uncertainty in the estimates. Determine the effects of these uncertainties on BTA choice.

EPA Response

This outline repeats the discussion of a cost-benefit procedure presented in comment 316bNFR.068.324. Please see response to comment 316bNFR.068.324.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Evaluation of Social Costs

The costs included in cost-benefit assessments should reflect costs to society as a whole. The cost values should not include effects that represent transfers from one group to another. The most important social costs of BTA alternatives for electric power facilities generally can be organized into the following four categories:

1. Capital costs. Capital costs are the one-time costs of constructing and installing the CWIS technology.

2. Operating and maintenance cost. Operating and maintenance costs are the annual costs of operating and maintaining the CWIS technology.

3. Power costs. Implementation of BTA alternatives may lead to power losses due to plant shutdown during construction. BTA alternatives also can impact plant performance, which causes a decrease in power generation. These power losses lead
to social costs.

4. Other environmental costs. These include the environmental costs that result from the installation of the CWIS technology. They include, for example, potential air pollution increases.

Both of the first two cost categories – capital costs and operations and maintenance costs – are straightforward conceptually and need not be discussed further here. It is useful, however, to provide additional discussion of the other two categories: power costs and environmental costs.

Power costs may occur in the following two circumstances.

-Power Costs during Construction Delay. If the alternative would delay the opening of the plant, then the power output (generation and capacity) would be lost during that period. The costs of replacing the lost power represent real costs.

-Power Costs during Continuing Operations. BTA alternatives may lead to reductions in plant performance due to auxiliary power requirements, turbine inefficiencies (heat or performance penalties), and reductions in maximum generation capacity. Each of these impacts results in power costs.

Power losses include both the loss in available capacity (i.e., megawatts) as well as the loss in expected energy output (i.e., megawatt hours). The traditional method of calculating these costs is to determine what additional costs would be incurred to make up the loss. With increasing competition in

wholesale electric power markets, these costs can be increasingly determined from market prices, both for capacity and energy output.

Environmental costs reflect the cost of environmental externalities that can result from implementation of BTA alternatives. The following are examples of potential environmental costs:

-Air emissions. The auxiliary power requirements and performance penalties resulting from some technologies (e.g., cooling towers) can result in reduced generation at the unit. These power losses would be compensated for by increased generation at other units. The replacement power may lead to an increase in overall electricity air emissions or increase the cost of achieving fixed emissions targets.

-Water contamination. A potential BTA technology might require that a water body be dredged, necessitating disposal of potentially hazardous material. Thus, the release of that hazardous material into the environment might result.

-Visibility and wildlife impacts. Implementation of cooling towers, for example, may result in visibility impacts due to the siting of large cooling towers and wildlife impacts (e.g., birds that collide with cooling towers).

Markets are sometimes available to price these environmental costs. Under the Title IV SO2 trading program, for example, the total national SO2 emissions from electricity generators does not change if emissions go up at some facilities. As a result, changes in air emissions at some facilities due to cooling water intake technologies would lead to changes in the cost of achieving emissions caps rather than increases in national emissions. The prices of emissions permits in the SO2 program provide reliable sources of information on the costs of changes in air emissions.

When markets are not available to evaluate these environmental costs, they should not be ignored. These costs should be included in a quantitative or qualitative fashion as part of the overall cost evaluation of cooling water intake alternatives.

EPA Response

This comment reiterates issues raised in another comment. Please see the response to comment 316bNFR.068.325.

Comment ID 316bNFR.524.078

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

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Evaluation of Benefits

The benefits included in the cost-benefit assessments should reflect benefits to society. Estimates of environmental benefits reflect social benefits when they are based on the willingness to pay ("WTP") of individuals who receive the increased environmental services (e.g., recreational fishing services). WTP represents the value of a good or service in monetary terms (i.e., the amount the individual is "willing to pay" in dollar terms).

The following are the two major components of fish protection benefits due to installation of cooling water intake alternatives.

1. Benefits from Changes in Commercial Species. Regulatory requirements leading to changes in the stock of species used commercially (e.g., commercial fishery stocks) can lead to changes in yields or total production. Assuming that the changes do not affect market prices, the benefits can be calculated as the expected change in commercial output multiplied by wholesale market price per unit.

2. Benefits from Changes in Recreational Species. Regulatory requirements leading to changes in the stock of species used recreationally (e.g., recreational fishery stocks) can lead to changes in recreational benefits. Under these circumstances, the guidelines suggest using methods that capture individuals' willingness-to-pay for recreational services.

There may be other categories that are relevant in special situations. When, for example, there is an immediate danger of species extinction, there can be an "existence value" attached to a CWIS that protects the species from extinction. It is important to note, however, that such existence values are relevant only when the change would result in a long-lasting and fundamental biological gain (e.g., saving a species in the waterbody from extinction) and, thus, would not generally be relevant to § 316(b) cost-benefit analyses.

Both commercial and recreational fishing benefits can be estimated using methodologies and empirical studies that have been developed in the environmental economics literature. As discussed below, it would be desirable for EPA to develop specific procedures for using this information in individual site-specific cases.

EPA Response

This comment reiterates issues raised in another comment. Please see the response to comment 316bNFR.068.325.

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Best Technology Available-Cost Considerations	

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Simple Numerical Example

It is useful to illustrate the use of cost-benefit principles with a simple numerical example. Table 1 provides an illustration of the costs and benefits of three technologies that could be applied at a particular facility. The illustrative technologies represent increasingly expensive means of reducing fish losses at two identical facilities. The table shows the cost of applying each of the three technologies as well as the fish protection (and other) benefits if each of the three technologies were employed. The table also illustrates the incremental cost and incremental benefit of each of the technologies. Incremental cost is defined as the added cost of each technology relative to the previous one. For example, the incremental cost of Technology 2 is $50 million, the difference between the total cost of Technology 2 and the total cost of Technology 1 ($75 million minus $25 million).

Table 1. Illustration of the "Maximize Net Benefits" Approach

[see original document for original table]

The benefit-cost criterion implies that the choice should be based on maximizing the net benefits, i.e., benefits minus costs. Net benefits are maximized for Technology 2, which is predicted to produce a net benefit of $50 million dollars for each of the two facilities. Although the more expensive Technology 3 has benefits ($175 million) that are greater than costs ($150 million), net benefits would be only $25 million, substantially less than the net benefits of Technology 2.

The rationale for stopping at Technology 2 can also be explained in terms of the incremental costs and incremental benefits of Technology 3 relative to Technology 2. The table shows that the incremental cost is $75 million and the incremental benefit is only $50 million of adopting Technology 3 relative to Technology 2. This illustrates the general rule that a more expensive technology would increase net benefits if its incremental benefits are greater than its incremental costs.

Note, however, that there are some complications of relying only on incremental costs and incremental benefits to determine the "best" technology. Table 2 illustrates this complexity. This table assumes there is a Technology 2a that would have a cost between Technology 1 and Technology 2 (now relabeled Technology 2b). Using the "incremental benefits exceed incremental costs" rule would suggest stopping at Technology 1, because the incremental costs of Technology 2a (15) exceed the incremental benefits (10). Note, however, that using the criterion of maximizing net benefits provides the correct result regardless of the number of alternatives. Technology 2b is the "best" technology because it has the highest net benefits.

Table 2. Illustration of Complexity of Incremental Approach

[see original document for table]

The problems of using the “incremental benefit exceeds incremental cost” rule can be overcome by eliminating the intermediate technologies that would not be logical to choose when all technology choices are taken into account. Table 3 shows the alternatives with Technology 2a eliminated. With this appropriate set of technology alternatives, the “incremental benefits exceed incremental costs” rule gives the same result as the “maximize net benefits” rule.

Table 3. Paring the List of Alternatives to Avoid Confusion

[see original document for table]

EPA Response

EPA has fully considered the comment and thoroughly reviewed the numerical example used to illustrate the use of cost-benefit analysis in the selection of BTA. However, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

Comment ID 316bNFR.524.080

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Specific Data to Include in the Cost-Benefit Assessments

In the NODA EPA invites comment on whether it would be appropriate to ensure that the site-specific cost-benefit studies include assessments of particular categories of data and ecological risks and benefits.

EPA invites comment on whether it would be appropriate to ensure that such site-specific cost-benefit studies include assessments of the following categories of data and ecological risks and benefits: numbers of individuals of various species and age-classes impinged and entrained for each technology alternative; commercial or recreational fishing opportunities enhanced or foregone; and/or other categories of benefits such as impact on other recreational opportunities (e.g., birding related to bird populations that are in part dependent on fish populations).
66 Fed. Reg. 28871 col. 3.

This request for comments raises the more general question of what guidelines EPA should provide for preparing site-specific cost-benefit analyses. UWAG is sponsoring a study by NERA to provide specific recommendations on the process that EPA could use to ensure that site-specific benefit-cost analyses can be prepared without inappropriate delay or uncertainty. This study discusses the federal precedents that are available to provide the bases for these recommendations. Rather than comment on the specific categories noted in EPA's request, this section discusses the preliminary results of this ongoing study.

The site-specific approach recommended by UWAG requires facilities and permit writers to develop information on the benefits and costs of technology alternatives. EPA notes that UWAG previously has indicated that there are precedents for such an approach. These comments summarize these precedents and their implications for § 316(b) cost-benefit analyses. (Additional details will be provided in the NERA report mentioned above.)

EPA Response

EPA takes note of the study to which the commenter refers and looks forward to reviewing the results. This comment raises no direct issues to which EPA can respond.

Comment ID 316bNFR.524.081

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

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Precedents for Site-Specific Analyses

Various federal programs require EPA to develop site-specific environmental information. These programs require the Agency to develop procedures that provide accurate information without undue commitment of time and resources. Two programs are particularly relevant:

1. Natural Resource Damage Assessment ("NRDA") claims under the U.S. Superfund program and

2. Assessments of economic benefits of noncompliance with U.S. environmental regulations used as the basis for civil penalties.

This section provides brief overviews of these two programs and the implications for site-specific § 316(b) cost-benefit assessments.

NRDA Superfund

Section 301 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or "Superfund") of 1980 requires the U.S. Department of the Interior ("DOI" or "Interior") to develop regulations for NRDA for injuries to natural resources resulting from oil or release of a hazardous substance. The damages are based on the differences between the situation after the spill or release and the baseline conditions.

The regulations developed by DOI provide guidance for Federal, State and Indian tribe natural resource trustees to obtain compensation from potentially responsible parties for natural resource injuries. CERCLA requires that DOI develop two sets of regulations that trustees could use:

1. "Type A" procedures for simplified assessments requiring minimal field observation and

2. "Type B" procedures for conducting more detailed evaluations.

DOI has developed detailed regulations for implementing both of these requirements.

Type A assessments entail four phases:

-Pre-assessment Phase – determine whether an injury has occurred and whether a pathway of exposure exists.

-Assessment Plan Phase – undertake preliminary assessment of damages, including whether damages meet Type A criteria.

-Assessment Implementation Phase – collect data and perform damage estimation.

--Post-Assessment – prepare a Report of Assessment detailing the results of the damage assessment.

Damage assessments falling under Type A procedures, which are used when the damages sought are under $100,000, are undertaken using the NRDAM/CME computer model. This detailed but "user friendly" computer model was developed by DOI to offer a simple and formulaic method for calculating environmental damages caused by the release of hazardous materials. There are two versions of the model: one for the Great Lakes region and one for marine and coastal regions, each of which contains region-specific input data.

Type B assessments contain three phases:

-Injury Determination Phase – determine whether there has been an injury to natural resources and whether the injury is the result of a chemical release.

-Quantification Phase – quantify the change in natural resource services from a predetermined baseline condition.

-Damage Determination Phase – create a dollar value of the damages calculated in the Quantification Phase.

Type B procedures are more involved and expensive than Type A procedures. Thus, Type B procedures are usually undertaken only when the cost of obtaining the additional information exceeds the costs. Type B procedures, therefore, are typically used for larger cases involving more money and damages. However, built into the program is a "safety valve" that allows a trustee or potentially responsible party to use a Type B procedure, even when the value of the damages sought is less than $100,000. This safety valve helps ensure that, if trustees or potentially responsible parties do not agree with the NRDAM/CME damage estimates, they have the option of undertaking their own analysis.

The Clean Water Act and Clean Air Act both have provisions that mandate the recovery of economic benefits gained through the avoidance or delay of environmental compliance. In 1984, the EPA released its Policy on Civil Penalties and A Framework for Statute-Specific Approaches to Penalty Assessment. These documents seek to establish a single set of goals and a usable framework for the determination of environmental noncompliance benefit penalties.

The set of principles established in the 1984 documents form the basic framework for the current method of noncompliance benefit determination. Subsequent to 1984, the EPA created the BEN model, which is a complex but easy-to-use general model that calculates the benefits of environmental noncompliance quickly and inexpensively. EPA currently uses the BEN model to calculate noncompliance penalties for violations of almost all environmental regulations. The BEN model thus serves as a simple and streamlined method to calculate noncompliance penalties across many different areas of environmental regulation.

Although useful, the BEN model is only one aspect of current noncompliance benefit penalty policy.

EPA's current policy involves three steps:

1. "Rule of Thumb" Determinations – The EPA calculates a "Rule of Thumb" estimate of 5% per year of the delayed one-time capital costs for the period of noncompliance. If this estimate is less than $10,000, then it becomes the level of the penalty. If not, violators can use either of the two other options.

2. BEN Model – The BEN Model is a detailed but simple model that uses six case-specific inputs to calculate the benefit a violator has gained from noncompliance with environmental regulations. Once the BEN Model is used, the estimate it generates is the lowest the EPA is allowed to accept.

3. Litigation – Violators have the option of performing their own noncompliance benefit analysis and challenging the EPA in court.

The determination of economic benefits of noncompliance with environmental regulation is similar to the NRDA under Superfund in that it involves a tiered approach where smaller claims can be handled quicker and less expensively than larger claims. In the case of noncompliance benefits, the smallest claims of under $10,000 are handled by the "rule of thumb" analysis, which takes little time or resources for both parties. In addition, the BEN Model provides a streamlined and general method for calculating benefits from environmental noncompliance that is much less time- and resource-consuming than litigation. Similar to the Type B analysis discussed above, litigation involves an expensive process of collecting information for a private analysis, performing the analysis, and defending it in court. Typically, only larger violations for which the cost of performing this analysis is justified are litigated. However, the system does contain a safety valve that allows violators to litigate their claims, no matter how small the penalty. All violators thus have the option of litigating penalties, but also have credible lower cost options available to reach settlements.

EPA Response

EPA appreciates the information on site-specific cost-benefit assessments. However, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

EPA further rejects site-specific determination as the basis for establishing standards for BTA. The site-specific implementation of section 316(b) in the past has been inconsistent and burdensome for permit writers. However, the two-track approach of this final rule allows for site-specific considerations for facilities that choose to comply with Track II of the rule.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

Implications for § 316(b) Site Specific Cost-Benefit Analyses

The common thread in the two programs identified above is a tiered approach to developing site-specific information. In both programs, EPA has developed methods that require relatively few resources for those cases in which the value of collecting additional information and performing complex analyses is higher than the costs. The NRDAM/CME model and the BEN model both allow for smaller and less complex cases to be settled in a timely and cost-effective manner that avoids the "paralysis by analysis" problem. In both systems, larger claims would be evaluated with more detailed and expensive analysis. In addition, both systems contain a safety valve, which allows those who are dissatisfied with the simple analysis to perform their own analysis, subject to certain pre-determined standards.

The EPA could develop a similar <fn23> program for § 316(b) cost-benefit analyses. Such a system would involve a computer program that would allow a cost-benefit analysis to be completed using a few site-specific inputs that are easy and inexpensive to develop. The system also should allow companies to perform their own cost-benefit analysis subject to certain general cost-benefit standards and methodologies that would be developed in a rulemaking setting, with appropriate public inputs. The § 316(b) CWIS cost-benefit program should contain a safety valve, so those dissatisfied with the results of the relatively simple computer model would have the option of performing their own analysis. Such a system for § 316(b) determinations would allow for site-specificity and appropriately complex cost-benefit analyses while avoiding the problems associated with "paralysis by analysis."

EPA Response

EPA has fully considered the comment and appreciates the commenter's suggestions. However, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

Comment ID 316bNFR.524.083

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

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Whether Single or Multiple Year Baselines Should be Used

EPA specifically invites comment on one specific aspect of cost-benefit analysis of technology alternatives:

EPA also invites comment on whether site-specific benefit-cost studies should be based upon a single-year or multiple-year baseline.

66 Fed. Reg. 28871, col. 3. EPA does not indicate why this specific issue is singled out for comment.

UWAG believes that the issue of whether environmental baselines should be based on a single-year or a multiple-year baseline should be determined in the context of the general procedures to develop guidelines for § 316(b) cost-benefit analyses. As emphasized above, the procedures should include a tiered approach. Thus, the information called for on baseline conditions may differ depending upon the case. In cases in which relatively little data are to be collected, data for a single year are likely to be called for. In contrast, cases that justify substantial data collection may involve multiple years to provide a more accurate baseline. We emphasize, however, that this and many other specific issues should be determined as part of the process outlined above to provide guidance for § 316(b) cost-benefit analyses.

EPA Response

EPA has fully considered the comment and agrees that the information called for on baseline conditions may differ depending upon the case. The final rule establishes different baseline study requirements depending on which of the two tracks the facility chooses. A facility that complies with Track I will have very minor baseline study requirements as it will implement highly protective technologies with proven efficacies. If a facility chooses to comply with Track II, it has more involved and lengthy baseline study requirements.

With the respect to the cost-benefit analysis, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

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Subject Matter Code 18.0

Best Technology Available-Cost Considerations

What Test Should be Used to Determine BTA

EPA notes that it is considering various types of economic analyses to support a Track 2 decision on appropriate BTA technologies or performance standards.

The Agency invites comment on whether it should use the 'wholly disproportionate' cost-benefit test that has been previously used in many case-by-case section 316(b) decisions or one of the economic affordability tests described at proposal.

66 Fed. Reg. 28871, col. 3. As discussed in UWAG's initial comments and elaborated in more detail in NERA's November 2000 report, UWAG believes that the most appropriate economic test for assessing BTA is the "maximize net benefits" test. This section summarizes UWAG's reasons for believing that economic affordability should not be the primary criterion for determining BTA, and that the "maximize net benefit" test is superior to the "wholly disproportionate" cost-benefits test.

(1) Overview of Alternatives Identified in the Proposed Rule

In its proposal, EPA identified four cost tests for determining BTA:

1. Wholly disproportionate cost test. In the wholly disproportionate cost test, an alternative would not be considered BTA if the costs of implementing the alternative were "wholly disproportionate" to the environmental benefits achieved by the alternative.

2. Compliance cost to revenue test. The compliance cost to revenue test compares the cost of a BTA alternative to the revenues generated by the facility.

3. Compliance cost to construction cost test. The compliance cost to construction cost test compares the cost of a BTA alternative to the construction cost for the new facility.

4. Compliance cost to discounted cash flow test. The compliance cost to discounted cash flow test compares the cost of a BTA alternative to the discounted cash flow due to the construction of the new facility.

Of the four tests, the "wholly disproportionate" test is the only test that considers both the costs and benefits of possible BTA alternatives. As discussed below, however, the "wholly disproportionate" test is economically inferior to a test that would compare net benefits of BTA alternatives.

(2) Economic Disadvantages of EPA's Proposed Affordability

Approach

Although “affordability” is a useful concept, it is not desirable from an economic perspective as the sole criterion for selecting BTA technology. The “affordability” test proposed by EPA for BTA determination provides only a partial assessment of the economic factors and issues relevant to the determination of BTA. EPA’s approach has two major disadvantages compared to a benefit-cost test:

-Affordability ignores consideration of costs and benefits of BTA alternatives.

-Affordability ignores consideration of the incremental effects of increasingly stringent (and expensive) alternatives.

EPA’s “affordability” test does not compare the costs and benefits of alternative BTA requirements. As discussed in the November 2000 NERA Report, the lack of a comparison of costs and benefits is contrary to well-established economic principles as well as EPA/OMB Guidelines. By failing even to consider benefits and to compare costs to benefits, EPA’s proposed BTA test would not determine whether a given BTA alternative produced net social benefits.

The NERA Report illustrates how the proposed EPA test for BTA could lead to an economically undesirable policy decision. The report considered two hypothetical cases with the same compliance costs. In the first, the technology was “affordable” (i.e., facility revenues were large and thus the technology costs represented a relatively small fraction of the facility’s overall costs), but the benefits in terms of additional fishing opportunities were small. In the second case, the technology was “not affordable” (i.e., facility revenues were small and thus the technology costs represented a large portion of the facility’s overall costs), but the benefits were large. Under the affordability tests proposed by EPA, the expensive technology would be required at the low-benefit facility and not required at the high-benefit facility – just the opposite of a potential decision under a benefit-cost framework.

An important element of a complete BTA assessment is the consideration of the costs and benefits of all feasible technologies or operational requirements to achieving § 316(b) goals. EPA’s recommended BTA test does not appear to incorporate evaluation of multiple BTA alternatives. Failure to examine combined alternatives seriously limits the usefulness of information derived from the economic analysis by failing to provide any information on the incremental costs and benefits of alternative requirements.

There are a large number of technology and operational requirements that are candidates for BTA. These alternatives include the following:

-Changing/altering intake location,

-Technologies to reduce intake velocity (e.g. , passive screens), and

--Technologies to reduce impingement and entrainment (e.g., traveling screens, fish baskets, Gunderbooms, fish deterrents (strobe lights, air bubble curtains, and sound)).

The cost-benefit analysis should include all relevant alternatives that are feasible and likely to be

effective at the site.

(3) A “Maximize Net Benefits” Test is Superior to a “Wholly Disproportionate” Test for BTA

Evaluation of the costs and benefits of feasible alternatives provides the information that is necessary to identify the “best” technology or suite of technologies at a particular location. The best alternative is the alternative that maximizes net benefits, i.e., social benefits minus social costs. Relying upon a “wholly disproportionate” test – in which costly technologies are adopted even if the incremental benefits are substantially less than the incremental costs – is not as desirable as requiring that additional dollars spent to provide fish protection at individual sites be matched by additional benefits.

DOE does not support the “wholly disproportionate” cost-benefit test. DOE believes that a rational comparison of cost to benefit should be made to assess the merits of specific technologies. Also, limitations of the wholly disproportionate test are ably discussed in W. Anderson, II & E. Gotting, Taken In Over Intake Situations? Section 316(b) of the Clean Water Act, 26 COLUM. J. ENVTL. L. 1, section VI.D.1 (2001).

Even without a study of benefit-cost techniques, however, there are plenty of examples showing how such analyses can be done for § 316(b) decisions. The Permit Renewal Application for the Salem Generating Station, for example, dated March 4, 1999, contains a detailed analysis of costs and benefits of intake modifications and flow reduction alternatives, summarized in Table 9 to Appendix F, Section IX. A benefit-cost analysis would not necessarily have to be as elaborate as the one for Salem to satisfy § 316(b), but the Salem example does show that benefit-cost techniques are available and, in fact, are being used to help make § 316(b) decisions.

EPA Response

The commenter believes that the most appropriate economic test for assessing BTA is the "maximize net benefits" test and summarizes reasons for believing that economic affordability should not be the primary criterion for determining BTA, and that the "maximize net benefit" test is superior to the "wholly disproportionate" cost-benefits test. EPA has fully considered the information provided by the commenter. However, EPA has adopted the cost to revenue test for determining economic practicability. EPA determined economic practicability by considering the cost of the rule as compared with the revenue of a facility, as well as the cost compared to the overall construction costs for a new facility (for generators only). This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA which use very similar language to section 316(b) and to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA. For more detail please see response to comment 316bNFR.206.014 in comment category 10.11 and the preamble to the final rule. For EPA's position on the wholly-disproportionate test, see response to comment 316bNFR.008.013 above.

Comment ID 316bNFR.524.085

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Subject Matter Code 21.4

Cost Impacts

FINANCIAL IMPACTS OF THE BIOLOGICAL STUDY

EPA asks for comment on UWAG's assertions that delays associated with the proposed requirements for pre-operational biological monitoring could have significant costs. These costs would include the replacement value for electricity not generated because new facilities did not enter the market as quickly as they might have and increased costs of financing because the lender will be taking a greater risk over a longer term. UWAG also asserts that the biological monitoring requirement would create an incentive to build plants that are not subject to it and its associated delays and produce more expensive electricity. EPA therefore invites comments, especially detailed information, on the extent to which a year-long, pre-operational biological monitoring program might lengthen the time for new facility development beyond those normally associated with, for example, site selection, financing, construction, local permitting, and environmental assessments under other requirements.

At two power plants in the West, where once-through cooling pulls between 350,000 and 850,000 gpm of ocean water through the plants, the operator has been required to evaluate entrainment effects with at least one full year of larval sampling. Adding to that evaluation time and report writing, 15 months is the minimum time needed for a study. At one of these plants, the operator encountered a concern about entraining a listed species, a mudhole dwelling estuarine fish species, had its sampling held up several months (on the first filing), and ended up actually sampling for over 18 months.

Much of the cost of these studies is consumed in the laboratory evaluations of the species, and a rough estimate of the cost would be $1.0 to $1.5 million, with another $500,000 or so added for temperature monitoring and thermal analysis. (There is some overlap between the §§ 316(b) and 316(a) aspects of this work, since the operator generally has its marine biologists handle the biological studies related to thermal effects.) These thermal studies generally do not, however, consume more than $150-200,000 of the $1.5 million budget mentioned above.

This operator hopes to negotiate with its permitting agency a somewhat different, and perhaps less expensive, approach for a third facility, but that remains to be worked out.

EPA Response

EPA appreciates the information provided by the commenter.

In response to concerns about delays associated with pre-operational study requirements, EPA has designed the final section 316(b) New Facility Rule to minimize such delays. The two track approach allows facilities to avoid the three-year baseline study by complying with the requirements of Track I. EPA's analysis shows that 93 percent of in-scope combined-cycle facilities and 71 percent of in-scope

coal facilities already comply with the dynamic flow requirements of Track I in the baseline and therefore would not experience any operational delays. In addition, lead times for the construction of new combined-cycle and coal facilities range from three to four years (Table 43 of the Assumptions to the Annual Energy Outlook 2001). Therefore, the facilities that choose to comply with Track II and have to conduct a demonstration study that may require up to three-years will have sufficient time to incorporate the study into their construction plans. For facilities that plan to begin operation in the next three or four years, EPA has revised the demonstration study provisions so they are highly flexible to help reduce or eliminate operational delays.

The commenter also provides information on the cost of a baseline characterization study at two marine once-through facilities in the West. These costs fall within the range of the cost estimate of $1.0 million EPA has developed for similar facilities and is using in its cost and impact analyses in support of the final section 316(b) New Facility Rule.

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Subject Matter Code CP

Comment Period

EPA HAS GIVEN INADEQUATE TIME TO REVIEW THE NEW MATERIALS IN THE RECORD

As a final comment, UWAG feels compelled to say that EPA did not allow enough time to review the substantial number of new materials entered into the record. UWAG recognizes that EPA is under a court-ordered deadline to complete the § 316(b) rulemaking for new facilities. Unfortunately, that fact does not excuse or cure a possibly fatal procedural defect that is building up in the record of this proceeding. That schedule was negotiated between EPA and several private parties. On several occasions, UWAG asked for leave to intervene so that its concerns about the schedule under negotiation could be taken into account, but its requests have gone unanswered. Most recently, UWAG asked to be heard by the Cronin court on the current schedule, but neither EPA nor the Court responded to its concerns (EEI, et al. 1999 and 2000; Hunton & Williams 1999 and 2000; Southern District Reporters 2000a and 2000b).

On the NODA, EPA received a request for more time from another party and from UWAG but did not grant those requests. The result is that UWAG and other affected members of the regulated community have not had sufficient time to review the large number of documents that have been put into the record. An inadequate opportunity to address the technical bases of EPA's decision may well rise to a violation of the Administrative Procedure Act or even the Due Process Clause.

In particular, UWAG encountered the following problems in trying to review the new documents:

1. For many of the technical papers/sources, EPA has put only the cover page and table of contents in the record, making it impossible to judge their relevancy to the rule. There are more than 45 documents in this category. Even if some of the papers are available from other sources, EPA cannot simply list documents and incorporate them by reference into the record.

2. Several pieces of the record were made available only on CD-ROM (DCN#: 2-013E, 2-007, and 2-010). Despite our best efforts, we were unable to obtain these documents until June 5. Furthermore, once we received the documents, we were unable to retrieve two of them (DCN#: 2-007 and 2-010) from the CD-ROM. We then were advised that the information was available on the Internet. UWAG should not be obliged to use the Internet to compile a complete copy of the NODA record.

3. Also, on June 18, UWAG discovered that DCN#:2-036C, the SAIC Draft Energy Penalty Report, was missing some key attachments. We confirmed with the EPA Docket that the attachments also were missing from the official record. Although EPA supplied these attachments to UWAG on June 21, UWAG's ability to comment adequately on the SAIC report was greatly undermined by the delay in receiving these attachments.

UWAG understands that EPA is planning to reopen the rulemaking record to allow additional comments on those documents that were incomplete. UWAG appreciates EPA's willingness to reopen the record, but doubts whether this is an effective remedy at this late date in the rulemaking process. Most importantly, reopening the record on a limited number of documents does nothing to cure the problem that EPA has created by failing to provide its analysis of key issues. For example, EPA lists two different methods that it "may" use to estimate air emission impacts of dry cooling requirements. 66 Fed. Reg. 28,867 col. 2. Since EPA has not yet decided on its methodology – much less produced its analysis – UWAG can only speculate as to how EPA might approach the analysis.

Likewise, EPA says that it is "considering" using a methodology similar to that used in the proposal to "project the average size of new coal-fired facilities, the number that would be subject to the rule, and the baseline of intake structure technology that would be in place absent final regulations." 66 Fed. Reg. 28,856 col. 2. This analysis would be supplemented by data from the detailed industry questionnaire. Id. Again, EPA does not fully disclose its methodology, and it does not disclose what questionnaire data it means to bring to bear on this issue. UWAG's ability to comment effectively on these and other subjects is severely hampered by EPA's failure to present its analysis and its comprehensive view of how the large number of new documents affects its rulemaking proposal.

EPA Response

EPA believes that it provided sufficient time to provide a meaningful opportunity for public comment on the proposed rule and the Notice of Data Availability. EPA published a notice, reopening the comment period for an additional 30 days for certain documents referenced in the Notice of Data Availability. EPA reopened the comment period for those documents that had certain pages or references and attachments missing at the time the Notice of Data Availability was published in the Federal Register. Included in this set of documents was the Draft Steam Plant Energy Penalty Evaluation (DCN#:2-036C). EPA also reopened the comment period for two lengthy documents that were available in the docket in an electronic format (CD-ROM - DCN# 2-007, and 2-010) at the start of the public comment period, but were not copied and made available for off-site review until June 1, 2001. However, EPA notes that these documents were readily available through the internet and EPA provided the commenter with the world wide web site address. EPA did not reopen the comment period for the CD-ROM (DCN#: 2-013E). EPA believed that those who requested an electronic copy received it with enough time to review the information. Furthermore, the docket does have a CD-ROM reader on site that may be used by stakeholders to review electronic information if they so desired.

With respect to the estimates of dry cooling, the commenter has had ample opportunity to recommend to EPA how it would estimate these emissions and EPA provided sufficient notice of how it was considering addressing these issues. EPA has fully considered the comments provided by the commenter on this matter in developing the final rule analysis.

With respect to the information concerning how many new facilities are in scope of the final rule, EPA believes that it has provided adequate information on how EPA project the average size of new coal-fired facilities, the number of facilities that would be subject to the rule, and the baseline intake structure technology that would be in place absent final regulations. Furthermore, EPA suggested the

data sources it would use, and that it was considering the same method used at proposal, and opened for comment how it should approach such analyses. EPA believes that this, along with the meetings it has had with the commenters have provided the commenter have provided the commenter with adequate notice and due process.

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Subject Matter Code 23.6

Conflict with Administration's New Energy Initiative

EPA MUST COMPLY WITH NEW ENERGY-RELATED EXECUTIVE ORDERS

On May 18, 2001, the President issued two Executive Orders intended to help deal with energy shortages. One, entitled "Actions to Expedite Energy-Related Project" (Executive Order 13212), directs that for energy-related projects, federal executive departments and agencies must expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections. The other, Executive Order 13211, entitled "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," requires agencies to prepare a Statement of Energy Effects when undertaking certain agency actions. For matters identified as "significant energy actions," agencies must prepare a detailed statement relating to any adverse effects on energy supply, distribution, or use and reasonable alternatives to the action with adverse energy effects and the expected effects of such alternatives on energy supply, distribution, and use.

EPA's § 316(b) rule is a "significant energy action" as that term is defined in the Executive Order. Hence, EPA should prepare a Statement of Energy Effects, documenting the extent to which the new rule may make it more difficult to build new power plants and the extent to which required intake technologies will exact energy penalties. As has been amply documented in the record of this rulemaking, some of the alternatives EPA is considering could have serious adverse impacts on the country's supply of electrical energy. The Two Track approach, on the other hand, promises to protect fish from entrainment and impingement in a way that is least harmful to energy supply.

EPA Response

EPA disagrees with the commenter that the section 316(b) New Facility rule is a "significant energy action." EPA analyzed the potential energy effects of the rule and determined that the maximum reduction in available energy supply will be 100 MW. EPA believes that the estimated reduction in available energy supply as a result of the final section 316(b) rule does not constitute a significant energy effect.

EPA agrees with the commenter that a two track approach, upon which the final rule is based, provides environmental protection while at the same time reducing any potential impacts on energy supply. The two-track approach provides new facilities flexibility in meeting the requirements of the final rule and in expediting their permitting. For more information on EPA's compliance with Executive Orders 13211 and 13212, see Chapter 9: Other Economic Analyses and EPA's response to comment 316bNFR.512.003 above.

Comment ID 316bNFR.524.088

Subject Matter Code	10.01
	Regulatory Framework Options

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CONCLUSION

EPA is faced with making a rule prescribing "best technology available" for "minimizing" the impact of entrainment and impingement of aquatic organisms in situations where a CWIS would otherwise cause "adverse environmental impact." The problem lies in making a generic rule for impacts that quite clearly differ from one site to another, depending on a host of local factors, such as what species of fish are present, how they breed, how fast they swim, and where they congregate.

EPA now has considered a variety of alternatives for making such a rule, and based on the record that has been compiled, the best choice is clear. The first of the alternatives was EPA's original proposal. This relies on dividing waterbodies into types and then further dividing them by "littoral zone"; depending on which type of waterbody (estuaries are categorically treated as requiring more protection) and how near the littoral zone the intake is, EPA then imposes limits on flow or volume and on velocity. A variety of other requirements further complicate the proposed rule, and also make it inflexible.

The original EPA proposal is inadequate because it gives too little attention to local site-specific factors that are material to the issue of entrainment and impingement impact. Indeed, this proposed alternative is, in a sense, the worst of all possible worlds, because it combines both inflexibility and inefficiency. It is inefficient because it would eliminate at the outset many areas that might otherwise be suitable for a CWIS, provided adequate studies were done and provided the structure was designed to take advantage of local conditions. Thus, EPA's proposal categorically "zones out," or greatly restricts the use of, such areas as the "littoral zone" and estuaries. Yet the record in this rulemaking shows that littoral zone and estuaries are not necessarily sensitive to entrainment and impingement impacts throughout their entire reach wherever they exist throughout the country. Likewise, the EPA proposal would set inflexible rules about intake velocity and volume, and yet the rulemaking record shows that, for example, the relationship between intake velocity and impingement is complex, depending, again, on many factors, including what species are present and what is their swimming ability. And yet, for all this inflexibility, the EPA proposal does not make efficient use of resources, because even after zoning out so many areas, it requires a year of biological studies to make it work. The result is a very expensive, very inflexible solution.

Based on the NODA, EPA may be planning extensive changes to its original proposal. While EPA outlines many different options for individual sections of the rule, the NODA fails to integrate these options into a coherent proposal. While UWAG has done its best to comment on each option, it cannot even speculate as to what EPA's final rule will look like, and whether its final combination of options will be legal, scientifically valid, and supported by the record.

A second alternative, advocated by some environmental groups, would be to require dry cooling at all

new power plants. The record shows that the effectiveness of dry cooling depends on local dry bulb ambient temperature and is considerably more expensive than other alternatives. It works least well in the hot summer months, exactly when there is the greatest need for power. If EPA were to require dry cooling everywhere, based on the fact that it has been installed in a number of mostly small plants, mostly in Europe, it would be both illegal and unwise.

Finally, there is the Two Track approach, which combines efficiency with flexibility. It is efficient in several ways. First, the first or "Fast Track" allows a new generating facility to be approved quickly, provided the owner is willing to commit to pre-approved, highly protective technology for the intake structure. Second, by allowing a second "track" for individualized site studies, the Two Track approach avoids categorically ruling out sites that might, with study and careful design, prove acceptable for new generating facilities. Third, the Two Track approach, flexible as it is, is likely to avoid the energy penalty exacted by some technologies such as cooling towers.

It bears repeating here that the country is threatened with an energy shortage, at exactly the time when secure electric power is essential to new features of the economy like the Internet and integrated circuit fabrication. The President has directed federal agencies to expedite energy-related projects and to assess the effects on energy supply of rules likely to have significant adverse effects on energy. In these circumstances, more than ever, EPA should adopt a rule that does not impose heavy energy penalties on the country. The Two Track approach is the best such alternative available.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes uniform requirements on a national basis, whereas Track II provides dischargers with the opportunity to establish that alternative requirements will result in the same level of reductions in impingement and entrainment as would be achieved under Track I. The regulated entity has the opportunity to choose which track it will follow. See also response to comment 316bNFR.006.005.

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. EPA also believes this approach will promote environmental protection and sustainable economic development simultaneously since facilities will take economic viability into consideration while designing new facilities. New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

EPA rejects dry cooling as best technology available for a national requirement for reasons outlined under response to comment 316bNFR.006.001.

Comment ID 316bNFR.524.201

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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INTRODUCTION

Tellus Institute (TI) has written a 25-page report titled "Comments on the EPA's Proposed Regulations on Cooling Water Intake Structures for New Facilities". According to the report's introduction, the proposed rule issued by the US Environmental Protection Agency on August 10, 2000 "has specifically not included 'zero intake' (or virtually zero-intake) technologies, which can be provided by dry cooling systems". Therefore, TI prepared its report to "provide background information on dry cooling systems in an attempt to assist the Agency in evaluating a decision to implement a zero or near-zero
intake requirement".

However, a detailed technical review indicates that the TI report contains numerous errors, inaccuracies and misrepresentations regarding the design, operation and commercial status of dry cooling systems. Individually itemizing and addressing each mistake in the TI report is beyond the scope of this limited technical review. Instead, this review analyzes the TI report in terms of four major claims that TI either asserted or implied, but are technically unsupportable. Relevant page numbers and paragraph locations from the TI report are noted in brackets. For example [7.3] refers to page 7, paragraph 3.

1. Wet Cooling Will Be Superior to Dry Cooling at Almost Any U.S. Site Under Almost All Conditions. (Response to TI claim that dry cooling is not significantly less efficient than wet cooling, and, in certain instances, may actually be more efficient.)

To compare system efficiencies, either for wet and dry cooling or for a steam-turbine, one must understand the power generation process and the relationships between cooling system performance and ambient air wet-bulb and dry-bulb temperatures. Since certain statements in the TI report [8.2] indicate confusion in this area, the following discussion includes some explanatory background to clarify these misconceptions.

For a steam-turbine generator, the performance of the associated cooling system (dry or wet) is based on the system's ability to achieve a low steam condensing temperature at the turbine exhaust. Lower steam temperatures in the condenser will produce a greater vacuum on the steam turbine (reflected by a lower turbine backpressure) and mean a higher generating efficiency. As cooling system performance declines, the condensing steam temperature and turbine backpressure increase, and electricity generating efficiency decreases.

Modern steam turbines have the flexibility to operate over a backpressure range of about 1-9 inches Hga. The operating design point is usually set at the lower end of this range (2-3 inches Hga). Operation at higher backpressures is possible, but means a decline in turbine-generator efficiency and

a corresponding loss in power output. When the turbine backpressure reaches the manufacturer-specified maximum value, steam flow to the turbine must be curtailed (causing a unit derate) or the unit must be shutdown to avoid turbine damage. In this way, cooling system performance directly influences power plant efficiency.

For all atmospheric cooling systems (both dry and wet), the surrounding air is the ultimate heat sink for the thermal energy released by steam in the condenser. Thus, cooling system performance can vary with changes in atmospheric conditions. The critical parameters for wet and dry cooling systems are ambient wet-bulb and dry-bulb temperatures, respectively. The distinction between these two parameters is related to the manner in which heat is transferred to the atmosphere.

In a wet system, approximately 65-85% of the heat transfer is associated with the evaporation of a portion of the cooling water; the remaining 15-35% of heat transfer is due to sensible heating of the air passing through the system. Hence, the performance of a wet cooling system depends upon the combination of inlet air temperature and relative humidity, which are expressed by the ambient air wet-bulb temperature.

In a dry system, there is no evaporative loss of water, so all heat transfer is achieved by sensible heating of air passing through the system. Consequently, the performance of a dry cooling system depends upon the ambient dry-bulb temperature. Ambient dry-bulb temperatures are always equal to or higher than wet-bulb temperatures and tend to experience greater daily and seasonal fluctuations. As a result, dry cooling systems are more likely to have periods when their performance is reduced, particularly when ambient dry-bulb temperatures are high, as in summer.

According to actual dry cooling experiences reported by the plant managers at several new facilities which lose as much as one-third of their steam-turbine generating capacity during the heat of a summer day. Although the TI report indicates “some reduction in fuel-efficiency ... on the warmest days” [11.2], it does not quantify the magnitude of this capacity loss or mention that the loss will most likely coincide with times of peak consumer demand.

Instead, the TI report tends to focus on the better performance of dry cooling systems “in colder regions, where ambient air [dry-bulb] temperatures throughout much of the year are below 40 °F” [16.5]. The TI report further suggests that in these climatic conditions “dry cooling systems can actually be more efficient at removing heat than comparable wet-cooling systems” [7.4, 11.1]. In fact, the performance of both wet and dry cooling systems generally will improve in cold-weather climates, since lower ambient temperatures favor heat rejection. However, because of the larger daily variations in ambient dry-bulb temperatures, the performance benefits of cold-weather climates are proportionally more significant for dry cooling systems.

Even so, regions of the U.S. which experience average daily dry-bulb temperatures of 40 °F or less are extremely limited, depending upon the time of year (see Figures 1 and 2). During the month of January, the mean dry-bulb temperatures in the U.S are less than or equal to 40 °F for approximately the upper half of the nation. But in July, the mean dry-bulb temperatures do not even approach 40 °F except for the northernmost reaches of Alaska. Obviously, any improved performance that might be expected for dry cooling systems in colder climates would not be available to U.S. power plants during most of the year, particularly during the hotter summer months when consumer demand for electricity

is greatest.

Clearly, the performance of a properly designed and operated wet cooling system will be superior to a comparable dry cooling system for almost any U.S. site under almost all conditions. There is no disagreement on this point, since even the TI report concedes that “dry cooling systems tend to have a slightly higher heat rate (i.e., lower efficiency) than wet cooling systems due to the fact that the use of dry cooling technology ... increases the pressure and temperature of the turbine exhaust and decreases the output” [7.3]. This difference in systems performance is determined by the heat rejection mechanisms. The combination of evaporative and sensible heat transfer in a wet cooling system is much more effective at achieving desired steam condensing pressures than simple sensible heat transfer in a dry cooling system. Despite a number of assertions, the TI report presents absolutely no documented technical evidence regarding the equivalent or better performance of dry cooling systems. To the contrary, a recently completed study comparing wet and dry cooling systems for new combined cycle power plants at five sites throughout the country firmly establishes the performance advantages of wet cooling.

EPA Response

See response to comment #316bNFR.524.046.

Comment ID 316bNFR.524.202

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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The Advantages of Dry Cooling Do Not Compensate for the Disadvantages. (Response to TI claim that any inefficiencies attributable to dry cooling can be offset by other factors.)

The TI report implies that the lower performance of a dry cooling system is small enough to be offset by other factors, notably the increased efficiencies obtained from operating new, more modern power plants and the ability to reduce transmission losses by siting these new power plants closer to consumers. Since the magnitude of the performance penalty associated with dry cooling has already been addressed, the following discussion is limited to the two factors which the TI report suggests will compensate for those generating capacity losses.

Increased Efficiencies from New, More Modern Power Plants.

According to the federal Energy Information Administration (EIA), the majority of new electric power generation over the next twenty years will be provided by either combined cycle systems or combustion turbine/diesel systems. Only the combined cycle plants will require cooling systems for steam condensation. In addition, some of the new combined cycle capacity probably will involve cogeneration, which is the joint production of electric power and thermal power (in the form of hot water and/or steam). In cogeneration plants, the thermal power is provided by high-pressure steam which is diverted before entering the steam turbine or by medium-pressure steam that is extracted at an intermediate stage of the steam turbine. Hot water and steam which are physically transferred from the electric power cycle to be directly used for heating in unrelated systems obviously do not need a cooling system.

For several years, the efficiency of new combined cycle power plants has been on the order of 55%./6 More recent designs may increase the combined cycle efficiency to 60%. In addition, some of the newer combined cycle units may incorporate various techniques (such as humidification of the combustion turbine inlet air) to boost power generation. But regardless of the efficiency for any given combined cycle unit, the steam condenser heat rejection requirement for the cooling system (dry or wet) will be the same. In other words, an increase in combined cycle efficiency affects both dry and wet cooling systems equally. It is meaningless for the TI report to suggest that “just by building a new generating facility with better technology, there will be a significant energy gain which dwarfs any potential loss due to cooling system design” [8.2]. The continuous efforts of designers and manufacturers to improve turbine efficiency by only a few percentage points demonstrate the value of any energy loss. Electing to use a dry cooling system which results in generating capacity losses greater than a wet cooling system only negates any improvements achieved in combined cycle efficiency and is completely contrary to the direction taken by power producers in a competitive marketplace. The overall efficiency for cogeneration plants is often reported to be as high as 85%. However, such efficiency levels are misleading because they fail to account for the relative value of the two different energy streams (electrical power and thermal power). An overall cogeneration plant

efficiency that has been calculated by simply converting the thermal power (expressed as MBtu) into electrical power (expressed as kWh) assumes that heat and work are interchangeable. But, according to the Second Law of Thermodynamics, this is incorrect because different energy streams have different relative values. Electrical energy is of very high value; thermal energy has a lower value.

Therefore, the higher overall efficiencies reported for a cogeneration plant should not be mistaken as an increase in the efficiency of the power generation cycle, as appears to have been done in the TI report [8.2]. In fact, for a cogeneration plant, the efficiency of the power generation cycle will decline when the amount of steam (thermal power) diverted from the turbine results in operation away from the specified design point. So cogeneration does absolutely nothing to improve the efficiency of power production and should not be viewed as a means for offsetting the poor performance of a dry cooling system relative to a wet cooling system.

Reduced Transmission Losses from Locally Sited Plants .

The TI report suggests that “while dry cooling may reduce efficiency in energy generation, it may allow for an increase in transmission, thus yielding a net efficiency gain throughout the entire generation-to- consumption system. Line losses ... are generally between 5 and 11% systemwide” [7.5]. These statements presume that new plants which use dry cooling will not need to be sited near large water sources, so they can be located closer to the consumer. Doing so will reduce the transmission distances and the associated line losses.

The reasoning presented in these statements is overly simplistic and flawed on several levels. First, transmission losses include certain elements that are not substantially affected by distance. For example, the voltage step-up at the plant and subsequent step-down at the distribution substation and again at the customer represent transformer losses that will occur despite a decrease in the distance between power generator and power consumer. Second, efficiency gains or losses associated with electricity generation and electricity transmission are not directly comparable. As noted in the previous discussion, the term “efficiency” can be assigned different meanings and values. In order to have a rational comparison, generation and transmission efficiency gains or losses must first be normalized to some common basis such as cost increases or decreases (expressed in terms of mills/kWh). Finally, locating power plants closer to consumers is not always easy or even possibly, frequently because of consumer opposition. So the anticipated benefits from reduced line losses may be more imaginary than real.

EPA Response

See response to comment #316bNFR.524.046.

Comment ID 316bNFR.524.203

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

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The Capital Costs for Dry Cooling Systems Are 140% Higher and the O&M Costs are 94% Higher Than for Comparable Wet Cooling Systems. (Response to TI claim that dry cooling is not more expensive than wet cooling.)

Cooling system costs should be evaluated in terms of erected capital cost, annual operating and maintenance (O&M) cost, and replacement power cost. The erected capital costs must consider all elements that comprise the cooling system from the turbine exhaust flange outward (including not just equipment but site preparation, instrumentation and electrical systems, painting, acceptance testing, and all associated indirect items such as management, engineering and contingencies). The annual O&M costs consist primarily of labor, equipment maintenance, and auxiliary power requirements for fans and pumps (in the case of wet systems). Replacement power is defined as the loss in generating capacity incurred when the cooling system is unable to perform at design efficiency; and this replacement power must be provided (purchased) from another generating source at prevalent market rates.

A separate study has already presented a detailed cost comparison of wet and dry cooling systems for new combined cycle power plants. This study estimated that the erected capital cost for a direct dry cooling system was 140% higher than for a comparable wet cooling system with a mechanical draft tower. The annual O&M cost for the dry cooling system was estimated to be 94% higher than for the comparable wet cooling system. And, depending upon prevalent market rates, the magnitude of annual replacement power costs for a dry cooling system could begin to approach the value of annual O&M costs. Replacement power needs for the wet system using a mechanical draft tower were negligible.

This same study indicated that the approach used for estimating costs in an EPA report was incorrect and incomplete (potential replacement power costs were ignored). As a result, the cooling system capital and O&M cost estimates were understated by a factor of from 10 to 100 times (one to two orders of magnitude).

When compared with these well supported results, economic statements made in the TI report are unreasonable and undocumented. For example, the TI report claims to “have assembled some evidence that suggests that the capital costs and operations and maintenance costs can be lower than that developed by EPA for air-cooled structures” [15.2]. Although no information is provided to confirm this assertion, its validity seems unlikely given the problems already described for the EPA cost estimating approach.

Similarly, the TI report suggests that “in a scenario where future revenues are high [due to the high market price for electricity], the actual share of dry cooling costs may be lower” [16.2]. This assertion would only be true if dry cooling systems performed at design efficiency when market prices for power were high. But, as discussed previously, high market prices correspond with times of high

consumer demand that typically occur during the hot summer months which is when dry cooling system performance declines. Since high market prices are not likely to coincide with good performance for dry cooling systems, the scenario suggested in the TI report is implausible.

In another statement, the TI report indicates that “the additional costs associated with dry cooling can be more than offset simply by pursuing more cogeneration opportunities. Any energy efficiency losses due to dry cooling are insignificant compared to the efficiency gains of over 50% available from cogenerating” [19.2]. This position, mentioned earlier in the TI report [8.2], is completely unrealistic. As previously discussed, the higher overall efficiencies cited for cogeneration are mistakenly calculated and do not reflect any true increase in efficiency for electric power generation. In fact, the steam extracted and sold for its heating value reduces the amount of steam available to drive a turbine-generator for the production of electricity.

EPA Response

See response to comment #316bNFR.524.046.

Comment ID 316bNFR.524.204

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name Elizabeth Aldridge, J. Brad Burke & David E. Bailey

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Dry Cooling Has Been Used Primarily at Small Power Plants or in More Suitable Foreign Climates. (Response to TI claim that, based on widespread use at power plants throughout the world, d r y cooling is suitably proven for use at U.S. power plants.)

In the newly deregulated U.S. utility industry, the cost of power plant cooling systems is of crucial economic importance. As explained previously (and discussed in much greater detail elsewhere), the erected capital and annual O&M costs for dry cooling systems are substantially larger than for comparable wet cooling systems. Hence, in the present competitive marketplace, if a choice must be made between wet and dry cooling for electric power production, wet cooling is clearly the better choice. And the cost advantage of wet cooling, compared to dry cooling, has long been recognized, as noted in a 1989 EPRI report: "Where sufficient water is available at a reasonable cost and its use is unencumbered by regulatory constraints, conventional wet cooling tower systems will remain the economical choice, in most cases, for closed-cycle cooling of power plants in the United States for the foreseeable future."

Yet the TI report suggests that dry cooling is appropriate for widespread use at power plants in the United States. This position is based on a number of misleading generalizations concerning the worldwide use of dry cooling and a variety of inaccurate claims regarding current U.S. installations. In several instances, these statements are provided without the context necessary to fairly represent the facts.

For example, the TI report indicates that dry cooling "has already become commonplace … throughout Europe" [1.3]. However, the TI report does not mention that certain factors specific to the European climate and resources have contributed to the use of this technology. In July the mean European dry-bulb temperatures are generally less than 80 °F, approximately 10 °F lower than in the U.S. The more moderate summer climate means that European power plants with dry cooling systemsare less likely to experience generating capacity reductions. Furthermore, the greater European population density results in greater limitations on water availability and use for makeup to wet cooling systems. In some European communities, industrial facilities must pay fees to use surface waters that would be free in the United States. All of these factors provide dry cooling with economic advantages not found in the U.S.

In similar statements, the TI report notes that dry cooling is in use at "over 600 power plants throughout the world" [1.3, 9.3] and at power plants "operating in at least 20 states" [10.1]. Again, the TI report does not explain that the vast majority of the total "600 plants" are located abroad and that most of the U.S. plants with dry cooling are relatively small (<= 100 MW). In fact, a summary of data presented in Appendix A of the TI report shows that dry cooling systems started at U.S. power plants during the ten-year period 1990-1999 usually had a generating capacity <= 100 MW:

Plant Capacity (MW)	Number of Plants
< 50	6
50-100	8
> 100	2

More extensive worldwide data provided by the three major dry cooling system suppliers (Balcke-Dürr, GEA Power Cooling Systems and Hamon) indicate that during the same ten-year period (1990-1999), only 36 dry cooling systems were started at power plants with a generating capacity greater than 50 MW. Although ten of those plants were in the U.S., only one had a generating capacity greater than 200 MW. These data also show that 75% of the dry cooling systems built at power plants in the last decade were not in the United States but abroad. Apparently, the circumstances at these foreign sites were more conducive to dry cooling, most likely due to favorable climatic conditions and/or limited water resources.

The TI report also seeks to bolster the acceptance of dry cooling in the U.S. by claiming that "the growth in electric generating capacity using dry cooling systems in the U.S. has increased significantly, by over 3600 MW, or 15.4% per year between 1985 and 1998. By contrast, the amount of new generating capacity cooled by evaporative [wet] cooling systems has increased by just 0.2% per year (or roughly 10,000 MW) over the same time" [9.3]. However, neither the dry cooling or wet cooling data are accurate. The TI source of dry cooling capacity growth is dated 1991, meaning most of the data are estimates and not actual installations. In reality, actual U.S. dry cooling installations for the five-year period 1995-1999 totaled 379 MW, and represented an estimated increase in U.S. dry cooling usage of about 2.8% per year over that time. The reported increase in evaporative (wet) cooling systems at power plants during the same five-year period was 10,225 MW or about 1.2% per year. Granted, the annual growth rate for dry cooling is greater. But the existing installed capacity for wet cooling is enormous when compared with dry cooling, so a very small percentage increase represents a huge amount of new capacity. In fact, wet cooling systems accounted for over 95% of all new power plant cooling from 1995 to 1999 (10,225 MW vs. 379 MW).

The TI report also uses broad generalizations to suggest that dry cooling experiences abroad can be directly translated into potential U.S. applications. Using less than 10% of the total number of dry cooling systems installed worldwide and the Köppen Climate Classification System, the TI report indicates that most (69%) of dry cooling systems are built in regions having "moist, mid-latitude climates with cold winters" [11.Table 4]. The unwritten inference is that this Köppen Climatic Zone is representative of much of the U.S. But this analysis is flawed for several reasons.

First, the Köppen Climate Classification System is supposedly based upon annual and monthly means of dry-bulb temperature and precipitation. But instead of using historic temperature and precipitation data, it accepts wild or natural vegetation as the best expression of the totality of a climate. So many of the climatic boundary limits are selected with vegetation limits (and in some cases, geographic regions) in mind. Therefore, the system is empirical and not rigorous.

Second, the key parameters relative to the performance of dry cooling and wet cooling systems are simply ambient dry-bulb and wet-bulb temperatures, respectively. Although the Köppen System empirically incorporates the ambient dry-bulb temperature, it tempers the importance of this parameter by including precipitation as well. There is no evidence to suggest that climatic regions determined by

balancing these two parameters is a meaningful approach for evaluating dry or wet cooling system performance. Indeed, there is no evidence to suggest that the Köppen System is either as good as or better than traditional cooling system design and evaluation methods which directly use mean ambient dry-bulb and wet-bulb temperatures.

Finally, even if the Köppen System was shown to have some value as a means for predicting dry cooling system performance, only that portion of the U.S. along the northern tier of states would fit the key profile highlighted in the TI report as “moist, mid-latitude climates with cold winters”. More importantly, this area of the U.S. would also be characterized according to the Köppen System by the added description of “hot summer”, which as previously discussed is a problem for dry cooling system performance. This was not mentioned in the TI report.

EPA Response

See response to comment #316bNFR.524.046.

Comment ID 316bNFR.524.205

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

CONCLUSIONS

The Tellus Institute report prepared in support of dry cooling systems as a "zero-intake" technology under the EPA's proposed CWA §316(b) rule is seriously flawed. Assertions are made without any substantive technical discussion or documentation. Suppositions are represented as facts. At a minimum, the report is well intentioned but simply confusing; at the worst, it is deliberately misleading. Rather than providing anything of value to the current rulemaking activity, this report is a distraction and an impediment to meaningful dialogue and progress.

EPA Response

See response to comment #316bNFR.524.046.

Comment ID 316bNFR.524.301

Subject Matter Code	21.4
	Cost Impacts

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SUBJECT: Preliminary Review of SAIC Draft Report "Steam Plant Energy Penalty Evaluation"

As requested, we have reviewed the SAIC draft report titled "Steam Plant Energy Penalty Evaluation" (April 20, 2001), which was included as part of the recent USEPA Notice of Data Availability, 66 Fed. Reg. 28,853 (May 25, 2001). Unfortunately, we have had an extremely short time to conduct our review. As a result, we have not been able to check any of the detailed calculations presented in the subject report. However, we have been able to review the major aspects of the SAIC draft report with respect to the energy evaluation approach and the associated technical basis and assumptions.

Our review comments are divided into two sections: general and technical. In addition, many comments will reference the SAIC draft report with page numbers and paragraph locations in brackets. For example, [3.5] refers to page 3, paragraph 5.

General Comments

It was unclear to us whether the SAIC draft report was intended to address potential energy penalties associated with converting once-through cooling systems to open recirculated cooling systems (i.e., cooling towers) at existing plants or to compare energy penalties for different cooling systems at new plants. In places, the draft report appears to suggest that it is addressing the energy penalties associated with conversions of existing facilities. For example, the authors state, "This analysis evaluates … whether and to what degree there is an energy penalty for converting from once-through systems to wet towers" [15.1]. On the other hand, the methodology used does not take into account the complexities associated with converting an existing facility from once-through to closed-cycle cooling, especially with respect to redesigning and operating the system to accommodate the existing condenser and turbine. Assuming that the authors mean to compare penalties associated with use of new facility once-through vs. new facility wet recirculating cooling, that point should be made clearly, and the authors should insert a caution against using this approach to extrapolate to the energy penalties from conversions of existing facilities.

Technical Comments

1. The SAIC draft report indicates that "... the formation of condensed moisture within the turbine establishes a practical lower limit for condenser temperature ..." [3.5]. The potential for damaging condensation on the last stage of the turbine blading in actuality is mostly a function of the throttle conditions, shape of the expansion curve and the blade metallurgy. There is no modern turbine exhaust pressure minimum that will limit plant operation as suggested in the SAIC draft report. At best, the SAIC statement is theoretical.

2. The SAIC draft report bases its evaluation on a 1.5 in. Hga turbine backpressure, not only as the optimal operating point but also as the minimum below which “subcooling” occurs. To maintain this operating point, the SAIC draft report suggests that cooling system adjustments will be made [4.2]. This backpressure criterion is novel and not supported by fact. Although dynamic exhaust losses increase at lower turbine backpressures, many U.S. plants operate below 1.5 in. Hga for substantial portions of the year and do not “adjust” cooling system operations to maintain the 1.5 in. Hga value. While this assumption is not likely to have a huge effect on the calculated energy penalty (although it will tend to understate the penalty), it does suggest that the authors misunderstand certain important aspects of power plant operation.

The SAIC draft report also states that Attachment B shows the change in exhaust pressure is a function of only the cooling water inlet water temperature [4.1]. By apparently neglecting the controlling influence of the performance of the condenser (and cooling tower if a closed-cycle cooling system) on the turbine exhaust pressure, the resulting estimates could further potentially understate any energy penalties.

3. The SAIC approach for calculating turbine losses [4.6] is simplistic and ignores the subtle impacts of turbine design and power cycle efficiency documented through extensive industry experience and data on the effects of the low pressure turbine exhaust. Further review of the detailed calculations would be needed to assess the effect of this approach on the penalty calculated. Attachment C is reported as the net energy penalty for a nuclear reactor and that it is provided by “industry”[4.3]. The source is identified as Fleming but no other documentation is listed to allow an evaluation of the validity of his data. The references however denote that Mr. Bob Fleming is a National Accounts Manager for the Marley Cooling Tower. Because Marley Cooling Tower only sells cooling towers and does not design or provide any key equipment for the power cycle, we question its qualifications to offer an opinion in this matter and do not believe EPA should treat his data as dispositive.

4. The SAIC draft report indicates that 10°F is the average approach for recently constructed wet cooling towers [7.4]. In essence, it arrived at this value by using the arithmetic average of the approach value for a number of facilities which in turn had a wide range of wet bulb temperatures (ranging from 52 degrees F to 84.7 degrees F). Because the inherent thermal performance of a wet cooling tower can vary appreciably during the seasons of the year as the ability of the surrounding ambient air to absorb moisture changes, approach values are meaningless without the associated ambient wet bulb temperature. It is the wet bulb temperature that the power plant and cooling tower designer will also consider as a major parameter in designing a cooling tower that balances cost and availability against performance. The sensitivity of the wet bulb temperature in the design process is extensively discussed within the same Section of the Hensley reference from which Attachment F & G are taken but that instruction appears to have been overlooked by the SAIC report. The SAIC draft report further states the tower size factor is 1.5 at a 10F approach based on the curve in Attachment E. That curve, however, also depends on the wet bulb temperature at which the curve was developed and it cannot be assumed to be applicable as a general observation. At ambient conditions and cooling ranges that differ from the basis of the curve, the tower size factor may be appreciably different. In addition, the SAIC draft report does not mention if the assumed “approach” includes recirculation, which is an important factor to include. All of these factors could cause the SAIC energy penalties to be understated.

5. The SAIC draft report assumes that the “approach” temperature of the condenser (and, hence, the station energy and generation) is “... set equal to the ambient air wet bulb temperature plus 10°F” [7.5]. This is a major technical error. As noted in 4 above, variations in the heat transfer in a cooling tower produce variations in the operating approach during different times of the year. This variation in operating approach explains why a cooling tower with an 8°F design approach for an 80°F inlet air wet bulb temperature does not freeze solid when the temperatures fall below zero in the winter (conditions encountered in the northern U.S. and Canada). This error will significantly minimize the energy penalties for wet cooling tower systems calculated according to the SAIC approach.

6. The SAIC draft report indicates that the relationship between turbine backpressure and cooling water temperature was estimated because data were not available. However, a large body of widely accepted industry criteria and knowledge exists (e.g., the Heat Exchange Institute Standards for Steam Surface Condensers) and can be used to properly estimate the quantitative relationships of the condenser operating conditions to the turbine and plant generation. Instead, the SAIC report estimates these effects using a technique [9.2] that is, at best, very imprecise and that will contribute to a flawed evaluation of energy penalties.

7. The SAIC draft report omits the fan gear efficiency (typically 96%) and selects an optimistic fan motor efficiency (95% instead of 92%) [13.1]. [Burns, J.M. and Brochard, D, “Cooling Towers”- Section 4.8 in the Handbook of Energy Systems Engineering, pg. 519, J. Wiley & Sons, NY, 1985.] Underestimating the power needed to drive the fans will result in an underestimate of the energy penalty.

8. The SAIC draft report assumes a cooling water velocity of 5.7 ft/sec as optimum [13.4]. This value is very low by power industry standards and would result in exceptionally large circulating water pipes, valves and construction trenching requirements. Past physical observation of the size and flows of the cooling water system piping in combined-cycle, fossil and nuclear steam power plants has determined the their cooling water velocities range from 8 to 11 ft/sec. For example in “The Impacts of Retrofitting Cooling Towers At A Large Power Station”, [JM Burns, et. al., EPRI Cooling Tower Technology Conference, 1994], 185,000 gpm of cooling water is conveyed in each 7 ft. diameter pipe. That results in a water velocity of over 10 ft/sec. The water velocity normally does not exceed 12 ft/sec to limit potential pipe erosion [Cheremisinoff, N.P, and P.N. Cheremisinoff, Cooling Towers Selection, Design and Practice, Ann Arbor Science, 1981]. The lower velocity assumed by SAIC minimizes the auxiliary power requirements in the energy penalty calculations, but unrealistically increases piping capital costs.

9. The SAIC draft report assumes two inaccurate values for the static head associated with pumping water from the makeup source to the condenser because no data were “readily available” [14.3]. As noted in 7 above, substantial data are available in well known industry resources.

10. The SAIC draft report also assumes that in once-through cooling systems, water flows back from the condenser to the source by gravity [14.3]. This is a major technical flaw. In reality, to reduce the power requirements of circulating water pumps, the hydraulic flow paths of all condensers are designed as siphon circuits so that condenser elevation differences do not need to be overcome by the pumps. Waterbox vacuum priming systems are regularly designed in once-through systems to facilitate and ensure this type of hydraulic flow occurs.

11. The SAIC draft report fixes the cooling tower height and the associated static head for pumping [14.4] instead of using well known industry resources to better estimate the variable height of a cooling tower. In addition, the SAIC draft report has used a fairly small value to estimate the dynamic head but has neglected to include the pressure head required by the hot water spray nozzles in order to obtain a uniform spray of cooling water coverage over the fill. If the amount of head to be overcome is greater, the amount of energy needed will be greater. Therefore, this approach will tend to understate the energy penalty.

12. The SAIC draft report states that "for fossil fuel plants the energy penalty affects only the amount of fuel used since operating conditions can be modified to offset the penalty. However, the same is not true for nuclear plants, which are constrained by the limitations of the reactor system" [7.1]. Note that other constraints such as their licensing agreement also cap nuclear plant generation. In addition, the statement with respect to fossil fuel-fired plants is true only up to a point. While minor increases in backpressure can be overcome by burning more fuel to produce more steam, the ability of the system to compensate is limited by design constraints or a specific component restriction within the turbine, the boiler, the feedwater or cooling systems. When that particular plant pinch-point is approached, the generation must be reduced. Otherwise, the unit may trip off line or alternatively risk voiding an equipment warranty or other operational problem. In any event, a derate (reduction in generation) will always result in a greater energy loss than those associated with burning more fuel.

13. The SAIC draft report correctly applies the energy penalty for combined-cycle facilities only to the steam efficiency component, but inaccurately assumes that the steam efficiency component is one-third of the total plant efficiency or 17% [3.1]. While SAIC does not identify the source of the "report" on which it based, its figure of one-third, it most likely stems from the assumption that plant capacity and efficiency are equivalent. While a combined-cycle configuration of two combustion turbines to one steam turbine, with each unit providing roughly one-third of the capacity, is fairly common (without considering the effects of duct firing),it is not fair to assume that the steam turbine accounts for only one-third of the efficiency. The detailed thermodynamic cycles of each must be considered to make this evaluation. Table 1 in the SAIC draft report, which shows that fossil fueled steam turbines standing alone are approximately 30%more efficient than combustion turbines standing alone, illustrates why this is so. Of course, the contribution of the steam turbine to the total efficiency at any given combined-cycle plant will depend on the design and operation of the plant. However, making this assumption likely will tend to underestimate the effects on total efficiency of imposing a given percentage energy penalty on the steam turbine.

Conclusions

Based on the preliminary review comments discussed above, the SAIC draft report contains flaws that must be corrected before USEPA relies upon it .

EPA Response

See response to comments 316bNFR.524.046 and 316bNFR.501.024.

Comment ID 316bNFR.524.401

Author Name	Elizabeth Aldridge, J. Brad Burke & David E. Bailey
Organization	Hunton & Williams o-b-o Utility Water Act Group (UWAG)

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

REVIEW OF EPA PROPOSAL FOR ESTIMATING AIR POLLUTANT EMISSIONS ASSOCIATED WITH WET AND DRY COOLING TOWERS

DATE: June 24, 2001

TO: Utility Water Act Group

FROM: Wayne Micheletti

SUBJECT: EPA Proposal for Estimating Air Pollutant Emissions Associated with Wet and Dry Cooling Towers

As requested, I have reviewed the brief discussion on estimating air pollutant emissions associated with wet and dry cooling towers that was presented in the recent EPA Notice of Data Availability (NODA) 66 Fed. Reg. 28,853 (May 25, 2001). In doing so, I have also reviewed the following two references included in the record:

2-039A Kendal, Ashley L., Technical Review Document Operating Permit 960PMR153, March 16, 1998.

2-039C EPA, AP-42, Fifth Edition, Volume 1 [Section 3.1]. April 2000.

To avoid confusion, it should be noted that the air emissions under consideration (notably NOX, SO2 , CO2 and Hg) are not released directly from either a wet or dry cooling tower, but result from the energy penalty incurred by using a wet or dry cooling tower instead of a wet once-through cooling system. This energy penalty can be due to:

-An increase in unit heat rate when additional fuel is consumed by a unit to maintain design generating capacity during periods of slightly reduced cooling tower performance, and/or

-A unit derate when replacement power must be provided by a separate unit to offset lost generating capacity during periods of greatly reduced cooling tower performance.

In the first case, any increases in air emissions are known to come from a specific type of generating unit. In the second case, the replacement power source may be different than the derated unit so that any increases in air emissions will be subject to the mix of available generating capacity.

EPA has proposed two methods for estimating air pollutant emissions associated with wet and dry cooling towers:

1. Using emission factors from the Compilation of Air Pollutant Emission Factors, Vol. 1 (also known as AP-42). This technique has been widely used to establish unit-specific permit limits based on unit type, fuel and emissions control equipment. For each type of unit, the EPA plans to "adjust the emissions estimates, when appropriate to reflect a marginal comparison by using energy penalty estimates." The procedure for making this adjustment is not explained.

2. Using the Emissions & Generation Resource Integrated Database (E-GRID2000), which "provides emissions and resource mix data for every plant, electric generating company, state and region in the country." Under this approach, the EPA plans to "generate an emission rate per MWh or loaded hour ... to estimate increased emissions at plants that consume additional fuel." The procedure for generating these emission rates is not explained.

From the information presented in the NODA, either of the two methods for estimating air pollutant emissions associated with wet and dry cooling towers may be questionable for the following reasons:

1. Both Methods 1 and 2 depend upon reliable estimates of the energy penalties associated with wet and dry cooling towers. As discussed in an earlier memorandum (Jack Burns and Wayne Micheletti to Utility Water Act Group on June 23), the approach presented in a draft SAIC report ("Steam Plant Energy Penalty Evaluation" dated April 20, 2001) for estimating energy penalties associated with power plant cooling systems contains serious flaws that must be corrected before EPA relies upon it. These flaws would produce energy penalty estimates lower than would be reasonably anticipated. Use of these lower values, therefore, would produce lower estimates of corresponding air pollutant emissions.

2. Both Methods 1 and 2 require reliable estimates of the cooling systems mix (wet once-through, wet tower and dry tower) anticipated for future generating capacity. EPA has not fully explained how this mix will be estimated: a) in the absence of the proposed 316(b) rule for new facilities and b) as a result of different alternatives included in the proposed 316(b) rule for new facilities. Estimating a cooling systems mix that has: a) high percentages of wet and dry towers in the absence of the proposed rule and/or b) little change resulting from the different alternatives in the proposed rule would understate the associated estimated energy penalties and corresponding estimated air pollutant emissions.

3. For Method 1, the supporting information referenced in 2-039C suggests that the EPA anticipates all affected new generating facilities to be based on combustion (gas) turbines, either as combined-cycle or cogeneration units. While this may be true for the majority of new units (especially in the immediate future), this assumption ignores the potential for new conventional fossil-fueled units (coal and/or oil). Doing so underestimates the potential air pollutant emissions.

4. For Method 1, the AP-42 emission factor for mercury may be outdated based on new data obtained by EPA through a recent Information Collection Request (ICR). EPA should explain the implications of using the current AP-42 emission factor for mercury.

Method 2 "presume[s] that an individual plant [will] increase its loading in order to meet this energy cost [penalty] as opposed to delivering less power to the grid which in turn would be made up by a different plant." However, as discussed in an earlier memorandum (Jack Burns and Wayne Micheletti

to Utility Water Act Group on June 23), only minor increases in turbine backpressure (energy penalties) can be overcome through additional fuel consumption. Consequently, this method completely ignores the potential for replacement energy penalties due to unit derates. In a grid system based on economic dispatch, replacement power is generally available only from older, less fuel efficient units. Therefore, disregarding replacement energy penalties due to unit derates underestimates the associated potential air pollutant emissions.

EPA Response

Regarding point 1 made by the commenter: see response to comments 316bNFR.524.046 and 316bNFR.501.024.

Regarding point 2 made by the commenter: see the Economic Analysis for the projected cooling systems at future power plants.

Regarding point 3 made by the commenter: EPA did not ultimately rely specifically on reference 2-039C from the notice of data availability. Because the Emissions & Generation Resource Integrated Database (E-GRID2000), "provides emissions and resource mix data for every plant, electric generating company, state and region in the country," EPA utilized this resource to estimate air emissions increases for the final rule. In turn, the concerns of the commenter are met, in that EPA's estimates are accurate for new fossil-fueled units.

Regarding point 4 made by the commenter: EPA did not rely specifically on the AP-42 emission factors for estimating mercury emissions. Instead, EPA based the mercury emissions on measured and reported information in the E-GRID2000 database.

For the final rule, EPA estimates the increased air emissions to occur across the grid system and not from the effected plant. Therefore, the concerns of the commenter are met. However, for comparison, EPA analyzed the emissions projections for the cases where the effected power plant increases its fuel loading to meet the energy penalty. The emissions for each case were comparable, although new combined-cycle power plants do not emit significant quantities of mercury. See Chapter 3 of the Technical Development Document.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

C. Richard Bozek

On Behalf Of:

Edison Electric Institute (EEI)

Author ID Number:

316bNFR.525

Comment ID 316bNFR.525.001

Subject Matter Code 21.4

Cost Impacts

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

As the Agency is aware, EEI has significant concerns with the proposed standards for new facilities. The costs of deploying any given technology and the environmental benefit derived from the application of that technology will vary greatly on a site-by-site basis. Therefore, it is unlikely that any particular technology can be justified – scientifically or economically – at all facilities. This dilemma is exacerbated by EPA's reluctance to adopt a reasonable definition of adverse environmental impact ("AEI").

EPA Response

See response to comment 316bNFR.068.138 in comment category 10.04.

Comment ID 316bNFR.525.002

Subject Matter Code 10.16

Two Track Process

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

EEI commends EPA for expanding the discussion of alternative compliance approaches to the setting of standards for cooling water intake structures at new facilities. EEI is particularly supportive of the "two-track approach" outlined in the NODA. We believe that a well-designed decision framework providing for rapid technology deployment as one option and detailed site-specific investigation when appropriate as another option as outlined in the NODA has the potential to lead to rapid, scientifically defensible, economically appropriate and environmentally protective § 316(b) decisions.

EPA Response

See section V of today's preamble to the final rule for a discussion on the basis of today's requirements, including a discussion on why EPA did not accept the industry's two track approach in full.

Comment ID 316bNFR.525.003

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

As proposed, Clean Water Act ("CWA") § 316(b) rules for new cooling water intake structures (CWIS) would impose uniform, minimum technology requirements along with extensive site-specific study and monitoring requirements aimed at allowing permit writers to assess the need to impose even more stringent requirements in particular cases. This proposed Agency approach maximizes the costs of implementing section 316(b) by uniformly requiring technologies that may be more stringent than necessary at a given site while in essence avoiding grappling with the critical question of whether the environment is served. The proposal does very little to reduce the transactions costs associated with the standard.

EPA Response

See responses to comments #316bNFR.068.001 and #316bNFR.068.017.

Comment ID 316bNFR.525.004

Subject Matter Code 10.16

Two Track Process

Author Name C. Richard Bozek

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EPA should promulgate standards for new facilities based on the "two-track" approach recommended by EEI, UWAG, DOE and other commenters. This approach allows the Agency to effectively balance the need for environmental protection, administrative simplicity, and reliance on sound-science.

EPA Response

See response to comment 316bNFR.525.002.

Comment ID 316bNFR.525.005

Subject Matter Code 10.01

Regulatory Framework Options

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

EPA should cease reliance on oversimplified and arbitrary waterbody types (the "zoning" approach) as a means of guiding regulatory standards

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. See also response to comment 316bNFR.006.005.

Comment ID 316bNFR.525.006

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

EPA should define “adverse environmental impact” based on population-based effects.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.525.007

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA should refrain from requiring dry cooling as a "fast-track" requirement or more broadly as that technology is unnecessary to protect the environment, carries with it significant negative energy impacts and is inappropriate as a uniformly required tool based on the climate of the United States.

EPA Response

EPA has not adopted dry cooling based requirements for the final rule for some of the reasons described by the commenter, such as climactic inefficiencies. See Section V.C of the preamble to the final rule for a full discussion of the reasons that EPA rejected dry cooling.

Comment ID 316bNFR.525.008

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 21.0

Cost/Benefit Analysis

EPA should revise and provide for public comment a new analysis of the costs and benefits of its proposed standards prior to promulgation.

EPA Response

EPA disagrees with the commenter. EPA has revised it's analysis in response to public comment and the availability of additional, more detailed data. The final rule reflects these revisions. Moreover, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

Comment ID 316bNFR.525.009

Subject Matter Code	20.9
	Other Federal Statutory Requirements (NHPA, ESA, CZMA, NEPA, etc.)

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

EPA should complete a Statement of Energy Effect as required by Executive Order No. 13211, as this regulatory action clearly has the potential to have adverse effects on the supply of electricity.

EPA Response

EPA determined that the final section 316(b) New Facility Rule is not a "significant energy action" as defined in Executive Order 13211 ("Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use") because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. EPA analyzed the potential energy effects of the rule and determined that the maximum reduction in available energy supply will be 100 MW over 20 years (see Chapter 9: Other Economic Analyses). EPA believes that the estimated reduction in available energy supply as a result of the final section 316(b) rule does not constitute a significant energy effect.

Comment ID 316bNFR.525.010

Subject Matter Code OPP

General Statement of Opposition

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

The importance of § 316(b) rules goes beyond their cost implications for any specific plant, although cost issues are likely to be significant. Requirements imposed under § 316(b) may create undesirable energy supply consequences such as delays in plant construction, undue increases in energy production costs, and decreases in energy generating efficiency resulting in unnecessary fuel burning.

EEI and its members are committed to ensuring that adverse environmental impact associated with the operation of CWIS at electric generating facilities should be minimized. EEI does, however, take issue with the assumption that the existence of a CWIS is prima fascie evidence of an adverse environmental impact. Such an assumption is not supported by science or over 30 years of industry and state regulatory practice.

EPA Response

EPA has taken into account the energy supply consequences of each of its technology options and these consequences are presented in "Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities." EPA has taken a technology-based approach to the final rule, treating impingement and entrainment as one form of environmental impact. EPA believes that this is a reasonable interpretation of 316(b)and that the technology-based approach results in more certain and speedier permitting decisions than the case-by-case population or ecosystem effect approach.

Comment ID 316bNFR.525.011

Subject Matter Code OPP

General Statement of Opposition

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

EEI is concerned that the current Agency proposal, if promulgated will unnecessarily impair the ability of utilities to operate efficiently, both environmentally and economically.

Because electric utilities are the largest industrial users of cooling water, they have been heavily involved in the implementation of § 316(b) of the Clean Water Act for over 25 years. The utility industry has spent hundreds of millions of dollars on research and development related to § 316(b) issues. More important than the dollar expenditure, the industry has been applying the knowledge gained from that research to minimize the potential adverse environmental impacts associated with CWIS nationwide.

We continue to support EPA's stated goals for these standards of:

** Ensuring environmental protection;
** Reducing the administrative costs of implementing § 316(b) standards; and
** Improving the consistency and predictability of these standards.

Moreover, we believe that a cost-effective implementation of § 316(b) is essential to the implementation of the President's National Energy Policy. Poorly conceived § 316(b) standards have the potential to impose undue burdens on the generation of electricity and to impose delays that make it more difficult to bring new capacity on line. This would be at cross-purposes with the Administrator of EPA's stated support of the National Energy Policy.

EPA Response

EPA does not believe that the final rule will impair the ability of utilities to operate efficiently. See the preamble, Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities, and Economic Analysis of the Final Regulations Addressing Cooling Water Intake Structures for New Facilities for a discussion of the environmental and economic effects of the rule.

Comment ID 316bNFR.525.012

Subject Matter Code 10.0

Best Technology Available

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

As the Agency is aware, EEI has significant concerns with the proposed standards for new facilities. The costs of deploying any given technology and the environmental benefit derived from the application of that technology will vary greatly on a site-by-site basis. Therefore, it is unlikely that any particular technology can be justified – scientifically or economically – at all facilities. This dilemma is exacerbated by the EPA's reluctance to adopt a reasonable definition of adverse environmental impact.

EPA Response

EPA believes that the two-track technology approach adopted in the final rule serves the purposes of establishing consistent national standards that outline minimum requirements of location, flow, and velocity for new facilities while also providing flexibility to address site-specific concerns. Furthermore, as documented in Section VIII.B.3 EPA has determined that the two-track option is technically available and economically practicable for the industries affected by the rule.

EPA has identified factors that contribute to AEI, examined technologies that address these key factors, and established requirements based on which of these requirements or combinations of these requirements are available, effective, and economically practicable. The final rule presents these technology-based performance requirements in a two-track approach that can be implemented on a site-specific basis as deemed appropriate by the applicant. Please refer to Section VI. B in the final rule for EPA's description of what constitutes adverse environmental impact under this final rule.

Comment ID 316bNFR.525.013

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

As proposed the § 316(b) standards have the potential to:

** Impose undue cost burdens on the generation of electricity. The costs estimated by the EPA in their Economic and Engineering Analysis of the Proposed § 316(b) New Facility Rule likely understate the actual cost of the standards due to an underestimate of the number of facilities affected and an underestimate of the costs associated with compliance (See OnLocation, Inc., EOP Group, Inc., Analysis Of The Number Of New Generating Facilities Subject To The Proposed § 316(b) Rule, November 2000, Appendix A).

** Impose unnecessary procedural requirements that have the potential to delay the construction and operation of new facilities.

** Establish precedents that have significant implications for existing facilities and, by extension, national energy policy.

The two-track approach offers the EPA a means of setting standards that meet all of its stated goals including consistent environmental protection with a lower probability of creating unintended adverse effects for the nation's nascent energy policy.

EPA Response

EPA disagrees that the rule will impose undue cost burdens on the generation of electricity. In fact, EPA concludes that the costs imposed on the electricity generation industry are economically practicable. See the preamble to the final rule. EPA has upwardly revised the number of facilities projected within the scope of the rule through extensive research, response to comments, and outreach to the regulated industry and related federal agencies. The costs associated with compliance have undergone similar review since proposal. The Agency refined the national and facility level cost estimates of the final rule based on extensive research, response to comments, and further outreach. See the Economic Analysis and Technical Development Document.

EPA disagrees that the final rule will impose unnecessary procedural requirements that will delay new facility construction and operation. See response to comment 316bNFR.525.014, 316bNFR.525.020, and Section V of the preamble to the final rule.

EPA also disagrees that the new facility rule will determine through implication the nature of the existing facility rule or national energy policy. In fact, the Agency has stated in many forums that the new facility rule is designed to meet its statutory requirements and allow flexibility for the nature of the existing source rule.

Regarding the industry proposed two-track approach, see response to comment 316bNFR.525.014, 316bNFR.525.020, and Section V of the preamble to the final rule.

Comment ID 316bNFR.525.014

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Subject Matter Code 10.16

Two Track Process

EEI FULLY ENDORSES THE TWO-TRACK APPROACH

EPA's proposed rule for regulating new facilities under § 316(b) of the Clean Water Act would impose rigid, technology-based performance standards. It is a classic command-and-control approach that arbitrarily categorizes CWIS into classes based on the type of cooling water source (such as estuary, lake, river, etc.) and the CWIS location within that source water. The proposed rule would require all new facilities, regardless of the deployed technology, to perform a variety of studies, including at least one year's worth of biological studies. Study findings would allow the permit writer to determine whether more stringent requirements should be imposed. EPA's proposal, however, provides no clear standard for determining when such requirements might be warranted or what they might entail.

As industry has pointed out in extensive comments, EPA's proposal (1) ignores decades of sound science that has been developed to assess CWIS effects on aquatic resources and to guide the environmentally protective and cost-effective design of CWIS; (2) imposes huge burdens for little or no meaningful environmental gain; and (3) will be extremely inefficient and burdensome to apply, both for permit writers and the regulated community. EPA's proposal achieves none of its stated goals, which include assuring appropriate environmental protection, providing the regulated community clear and consistent standards to apply, and reducing administrative burdens for permit writers. Instead, the proposal:

·discourages the development and use of CWIS technologies adapted for site-specific circumstances;
·impedes selection of the most cost-effective alternative to minimizing adverse environmental impact;
·requires all facilities to do costly pre-operational studies that are unlikely to provide useful information;
·gives permit writers little or no guidance on how to interpret information to make final § 316(b) decisions.

The waste and inefficiency built into EPA's proposal is of particular concern to energy producers who are under intense pressure to develop a huge number of new generating units over the next several years, to meet regional and national energy demands.

There is an alternative, endorsed by EEI, UWAG, DOE, and other commenters, that would be more environmentally protective, cost-effective and efficient. EPA describes that alternative in its recent NODA and requests comment on it. The "two-track" approach provides incentives for developers of new facilities to use certain highly protective technologies that will protect aquatic resources as one option while at the same time provide for site-specific § 316(b) determinations (which have been made routinely for new facilities over the past 25 years) in appropriate cases as another option.

Due to the number of options discussed in the NODA, the two-track approach may have appeared to be overly complex. In concept, however, the two-track approach is very simple. It allows facilities to choose between two approaches to demonstrating compliance with the requirements of § 316(b).

Under Track 1 of the two-track approach, the developer of a new facility could choose to design its facility to meet two basic criteria: (1) very low flow, as would be consistent with the use of a wet recirculating cooling system, and (2) very low intake velocity. Years of experience, as well as numerous studies, suggest that such low flow and velocity characteristics, while costly to achieve, are highly protective, and go far beyond what is needed to avoid AEI in the vast majority of cases. Developers who chose to pursue this "fast track" would not have to perform any pre-operational or operational biological monitoring, and would not be subject to reassessment in subsequent permits, absent regulatory changes. As a second option within the fast track, a developer could choose to develop and submit data to show that an alternative intake structure technology which does not involve low flow or low velocity would provide a level of protection that is within the range expected from the low flow/velocity approach. Here too, extensive pre-operational or operational biological studies would not be required, although the developer would be responsible for developing the data and information necessary to show that the proposed technology would perform within the appropriate range, given the waterbody type, species present, and flow volume proposed.

Under Track 2, the developer would perform a site-specific study. The permit writer would use this study to assess whether the proposed intake structure configuration would create an appreciable risk of AEI and, if so, to determine what CWIS technology constitutes the best technology available ("BTA") to minimize AEI. BTA would consist of that CWIS technology or suite of technologies that maximizes net benefits. This second track would not require the same intensity of study for every site or proposed facility design. Instead, EPA would develop conservative assessment factors that could be used to streamline the assessment process in some cases. Appropriate and conservative assessment factors could be based on the waterbody's designated uses, the percentage of the waterbody to be withdrawn, and the percentage of the equivalent adults of any given commercially or recreationally important species potentially entrained or impinged. These assessment factors could be used either to eliminate the need for further studies at some facilities or to narrow the range of issues requiring study. For those cases in which an assessment is warranted, EPA could improve efficiency and consistency by providing guidance on study design and data interpretation.

While the choice of whether or not to pursue Track 1 would rest solely with the developer of a new facility (who is in the best position to evaluate whether meeting these highly conservative standards is technologically feasible and cost-effective), permit writers would have the authority to require the developer to pursue Track 2, where the permit writer has information that exceptional conditions exist, such that the CWIS is likely to cause AEI. Even with the use of highly protective under track one.

EPA Response

EPA disagrees that this rule imposes "huge burdens." In fact EPA's record demonstrates that the technology basis for the final rule represent current practice for a large number of the new facilities planned that will be subject to this rule. In fact, EPA believes it would be improper for EPA not to base the requirements of the rule on current practice where the record shows that the requirements are economically practicable for the industry as a whole.

Today's final rule establishes Track I requirements as best technology available for minimizing adverse

environmental impact. It also establishes a Track II, site specific approach design to take into consideration available data and specific conditions of the facility. However, the rule establishes that the permittee makes the choice of which track to choose. EPA has not chosen commenters suggestion that "permit writers [would] have the authority to require the developer to pursue Track II" in today's rule because both tracks represent the appropriate level of technology control. However, a particular state or other permitting authority may make use of its own state law to allow for such discretion to the permit writer as suggested by the commenter. In addition, EPA points out, today's rule, in 125.84(e), the permitting authority may require any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure or monitoring requirements at a new facility that it deems are reasonably necessary to comply with any provision of state law, including compliance with applicable state water quality standards, including designated uses, criteria, and antidegradation requirements.

Comment ID 316bNFR.525.015

Subject Matter Code 10.16

Two Track Process

Author Name C. Richard Bozek

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There are many benefits of this approach, including:

** administrative incentives (e.g., speed and regulatory certainty) to prompt developers of new facilities to provide aquatic resource protection beyond that which could be justified by the statute. It also preserves site-specific assessments for those cases where achieving such a level of protection is not technologically feasible or environmentally warranted;

** reducing costs and administrative burdens for permit writers and the regulated community by eliminating the need for pre-operational biological studies;

** ensuring that, where biological studies are needed, they will be efficiently designed, adapted to site-specific circumstances, and produce meaningful information;

** clear and consistent standards for decisionmaking;

** avoiding arbitrary and scientifically unsound categorization of new facilities based on a narrow range of factors, and the risk of creating unintended disparities among states and regions;

** focusing on the environmental performance of the CWIS rather than arbitrary design standards;

** providing an incentive for the development of new and more environmentally protective CWIS technologies, rather than foreclosing the use of such technologies if they cannot meet EPA's proposed design criteria;

** providing a mechanism by which developers of new energy projects can avoid the substantial construction and operation costs and delays that EPA's proposed approach may cause, especially for the large number of projected new facilities that are already under development, and that are essential to ensure reliable energy supply in many states and regions; and

** promoting the selection of new generating plant sites (including brownfield sites) based on consideration of net environmental benefits, rather than forcing site selection to accommodate the cooling towers that EPA's proposal mandates for many locations.

EPA Response

See section V of today's final rule preamble for a discussion on the basis of this rule and why EPA did not adopt the industry approach in full.

Comment ID 316bNFR.525.016

Subject Matter Code 10.16

Two Track Process

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The following examples illustrate how the two-track approach would be implemented and demonstrate that equivalent levels of protection can be achieved much more cost-effectively.

Hypothetical 1:

A developer proposes to build a new 750 MW gas-fired combined-cycle facility, of which 300 MW will be produced by a steam electric generator. The developer proposes to locate the intake structure on an estuarine site, because state law disfavors use of inland fresh waters and ground water for industrial purposes. The developer has contacted the permit writer and state fish and game authorities, who have examined the site and believe it is appropriate for this application. The developer's proposed facility design includes conventional traveling screens and wet recirculating cooling towers, which have been designed to reduce drift and noise, and will reduce flow to about 70% of that needed by an open-cycle system. In addition, the design approach velocity would be 0.5 fps or lower, although under certain conditions it may be slightly higher (approximately 0.6 fps). The facility as designed would withdraw 1.3% of the volume of the water column within the area centered about the opening of the intake.

Under EPA's proposal, the facility would not meet the design through-screen velocity requirements or the percentage-of-waterbody requirements (albeit by very small margins which will have no meaningful environmental consequences, in the state's view), so it would have to be redesigned. The developer would have to prepare and obtain state approval of a proposal for designing and constructing "additional technologies that minimize impingement and entrainment of fish, eggs, and larvae and maximize survival of impinged adult and juvenile fish." EPA's proposal contains no guidance on what those technologies might be or how the permit writer should evaluate any proposal the developer prepares. In addition, the developer would have to do a baseline biological study to characterize the aquatic populations in the vicinity of the proposed CWIS regardless of whether the waterbody has been well studied by other state agencies. This study may add 19-21 months to the pre-construction schedule.

Under the proposed two-track alternative discussed in the NODA, the facility would satisfy "Track 1," and the permit writer could issue a permit finding that the CWIS will avoid AEI and, therefore, satisfies § 316(b).

EPA Response

EPA agrees that the two-track approach is the best way to address many of the concerns raised by commenters, that is, to make the permitting process a certain and timely one as well as to allow for consideration of site-specific issues during the determination process. Today's rule allows the applicant to make a determination, at the outset, of which track will provide the best results for each new facility. See response to comment 316bNFR.525.014 as well as the preamble to today's rule,

section V and section VII.

Comment ID 316bNFR.525.017

Subject Matter Code	10.16
Two Track Process	

Author Name C. Richard Bozek

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Hypothetical 2:

A developer proposes to build a 500 MW gas-fired combined-cycle facility, of which 200 MW will be produced by a steam electric generator with a once-through cooling system. The developer proposes to site the facility on a medium-sized river in the Midwest. The waterbody does not support any commercial fisheries, but state fisheries management data show that the waterbody in the vicinity of the plant is part of a much larger area supporting recreational fishing. Based on all available fisheries management data, state and interstate officials do not believe there is anything biologically unique or sensitive about the waterbody in the vicinity of the proposed CWIS. The developer proposes to use wedge-wire screens, which, based on pilot-scale studies and performance statistics collected at similar fresh water sites with similar species and life stages, and similar flow and hydrodynamic characteristics, are likely to prevent entrainment of 75%-90% of the very early life stage organisms that would be entrained without the technology, and to prevent impingement of 95% of the otherwise impingeable organisms. Survival rates for entrained organisms are expected to range from 20%-80%, depending on the species and life stage affected. Flow velocity would be low, but the volume of water withdrawn would exceed that withdrawn if a recirculating wet cooling tower were used. Virtually all of the non-contact cooling water withdrawn would, however, be returned to the waterbody.

By contrast, a wet recirculating cooling tower would consume approximately 75% of the water withdrawn. Given total suspended solids levels in the source waterbody, a cooling tower would reduce flow by about 95% as compared to a once-through cooling system. None of the organisms entrained would survive passage through the cooling tower.

The developer is well along in the planning phases, and has already submitted applications for many needed permits. Its schedule anticipates that all permits will be issued within the next 7 months, allowing construction to begin. The developer has been in contact with the state NPDES permit writer and has submitted a permit application. The permit issuer has reviewed the documentation and, after consulting with the state's fish and game agency, has indicated that she agrees that the proposed CWIS design will avoid any appreciable risk of adverse environmental impact. The U.S. Army Corps of Engineers, which must issue a permit to place the screens in navigable waters, has indicated that it will issue the permit.

Under EPA's proposed approach, the developer would have no choice but to redesign the facility to reduce flow to a level consistent with use of a wet recirculating cooling system. This can only be done by installing a wet recirculating cooling tower. Wedge-wire screens, which would reduce environmental impacts to within the same general range, would not be permitted. In addition, the developer would have to do a baseline biological study to characterize the aquatic populations in the vicinity of the proposed CWIS regardless of whether the waterbody has been well studied by other state agencies. This study may add 19-21 months to the pre-construction schedule.

Under the two-track alternative, the developer would submit the documentation showing that the

wedge-wire screens will achieve a level of protection in the same range as a recirculating cooling system with low velocity. Indeed, given expected survival rates, as well as other benefits (such as far lower consumptive water and biocide use), and the improved energy efficiency of an open-cycle system, this approach would produce net environmental benefits overall. The permit writer would not, however, need to do any cost-benefit analysis or make any findings as to net environmental benefits. Rather, if the permit writer finds, based on the data submitted, that the proposed CWIS will provide a level of protection for the aquatic resource within the same range as the low flow/velocity option, she would issue the permit with a finding that the CWIS meets the requirements of § 316(b) because it will avoid AEI. To ensure that the technology works as expected, she could impose permit conditions requiring the developer to monitor entrainment and impingement at the screens for a year or two. There would be no delay in the development schedule, no unnecessary monitoring, no cross-media impacts, and no additional burden on the permit writer.

EPA Response

See response to comment 316bNFR.525.016 and the preamble to the final rule.

Comment ID 316bNFR.525.018

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Subject Matter Code 10.16

Two Track Process

For those facilities that choose track one, the administrative costs of the program will be reduced for both the permitting authority and the facility. It will also allow for more rapid permitting of new facilities at a time when construction of new capacity is badly needed.

Since the level of protection is pre-determined, there is a degree of certainty and technical consistency for facilities that select track one.

In other words, all of the EPA's stated goals for this rulemaking -- reduction in administrative cost, environmental protection, and increased consistency in decisionmaking -- will have been met. Moreover, the ability of developers to select track two and perform a site-specific evaluation provides opportunity for a more tailored approach to intake technology selection, and therefore avoids imposition of unnecessarily stringent restrictions.

EPA Response

EPA agrees that the two track approach will allow for certainty, reduced administrative costs and technical consistency for those who choose Track I; and the ability to do site-specific evaluations and consider other alternatives for those who choose Track II. See the preamble to today's rule, section V.

Comment ID 316bNFR.525.019

Subject Matter Code 10.16

Two Track Process

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The level of protection associated with closed-cycle recirculating (wet) cooling towers is highly conservative and will minimize adverse environmental impacts in all but the most extreme cases. The provision that allows a demonstration that an alternative has similar environmental performance to closed-cycle cooling recognizes that many existing technologies, such as Gunderbooms and wedgewire screens, can be as effective as closed-cycle cooling in many instances. This provision also encourages continued innovation in the design and application of technologies to control entrainment and impingement. After all, it is the protection of the environment and not the imposition of costs in the absence of marginal environmental benefits that is the goal of the Agency.

EPA Response

EPA agrees that today's two track, technology based rule will both protect the environment by minimizing adverse environmental impact at new facilities subject to this rule, as well as to allow for innovative technologies to be employed to control entrainment and impingement. See preamble section V for a discussion on the basis of today's rule, and section VII for a discussion on the implementation issues associated with this two-track approach.

Comment ID 316bNFR.525.020

Subject Matter Code 10.16

Two Track Process

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The second track involves potentially higher administrative costs for facilities. Therefore, it is expected that this track will only be selected rarely, where the track one level of effectiveness is clearly unwarranted. This should minimize concerns regarding administrative complexity of this track. It should be noted that the administrative costs associated with track two will be similar to those associated with the demonstrations required in the EPA's preferred proposal.

UWAG's comments suggest a number of specific criteria that could be used to conduct meaningful site-specific demonstrations. While we will not discuss these in detail here, note that any meaningful demonstration is based on the notion that determining the potential for adverse environmental impact must be assessed at a population or ecosystem (rather than individual organisms) level.

The two-track approach is both efficient and flexible. Moreover, it avoids creating any new barriers to the construction of new capacity that could worsen the growing disparity between energy supply and demand as described in the National Energy Policy. Track one is available for speeding new generating facilities online, in return for a commitment to highly protective intake structure technology, and also encourages innovative technologies. Track two allows for a tailored approach, based on site-specific factors, that avoids arbitrary restrictions that could serve as a disincentive to construction of new capacity. By providing a safety valve that avoids arbitrary restrictions, the two-track approach will be both environmentally protective and sound as a matter of energy policy.

Finally, the two-track rule would be consistent with EPA's long-term strategy of emphasizing market incentives and other nontraditional regulatory mechanisms instead of "command-and-control" regulations.

EPA Response

EPA agrees that a two-track approach allowing flexibility for the permit applicant is consistent with the policy of certainty in the permit process given the current energy markets. This approach also allows for site specific considerations when the applicant prefers it. However, EPA has not adopted a population based approach in today's rule. See response to comment 316bNFR.507.004 for a more detailed discussion on this issue. See also section VII for a discussion on the implementation of today's rule. See the preamble to the final rule for an explanation of why EPA did not adopt the industry two-track approach in full.

Comment ID 316bNFR.525.021

Subject Matter Code	21.2
Electric Generation Sector	

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The EPA states in the NODA that it intends to update the analysis of the number of affected facilities. It plans to do so using the February 2001 version of the RDI NewGen Database ("RDI"). EPA has not provided the results of this analysis for public comment. However, unless the EPA makes significant changes in the way it uses the information in the database, EEI is certain to have serious concerns with any conclusions the Agency draws from this analysis. In its first set of comments to EPA's proposed rule (November 9, 2000) EEI provided a thoughtful analysis regarding the use of the RDI data to draw conclusions about the number of facilities likely to be affected by the proposed standards (Id).

In addition, whatever the results of the new analysis, EPA should publish them for notice and comment prior to promulgation of final standards.

As was discussed in our comments on the proposed rule, the EPA Economic and Engineering Analysis of the Proposed § 316(b) New Facility Rule was evaluated and replicated by OnLocation, Inc., and the EOP Group, Inc.

The study identified three major areas of concern with the EPA analysis.

1.The RDI database used by EPA as their baseline for screening analysis was outdated, inaccurate and contains a number of geographic and technical biases that permeate the EPA's analysis.
2.Limiting the screening analysis to only those plants where state permitting authorities had knowledge of the cooling water system led to an underestimate of the number of facilities affected by the rule.
3.Reliance only on the Reference Case of the Energy Information Agency's Annual Energy Outlook led to an underestimate of the total number of affected facilities.

The re-analysis identified a number of issues in EPA's analysis, including problems of geographic and technological bias in the underlying database that lead to an underestimate of new plants. In addition, EPA assumed that only 12.5 percent of new steam cycle plants would be subject to the requirements of the rule. This assumption was based on very limited information of cooling system characteristics of a small group of new plants. Additional information from a telephone survey revealed that 44 percent of new steam cycle plants are subject to the rule. Finally, EPA extrapolated the results of its analysis over a 20-year period using assumption of plant size, electricity growth, GDP growth, and natural gas prices that resulted in a low estimate of the total number of new plants. Several of these assumptions were employed in a sequential manner in the analysis, creating a compounding effect in the results. The replication of the EPA analysis, using more appropriate assumptions, resulted in an estimate of 209 facilities that will be affected by the EPA rule, equivalent to over 60 percent of all planned new steam generation capacity. This indicates that the costs estimated by the EPA are significantly understated. It should also be noted that the EPA's incremental cost estimate is based on a specific technological and geographic mix that is significantly different from the distribution estimated by the re-analysis. This suggests that costs could have been underestimated by more than the factor of five. High cost of compliance also creates additional uncertainties in the financing of

new plants that could be reflected in higher interest rate costs of initial project financing.

The cost increase will be significantly higher for several reasons. There will be more coal-fired steam generating facilities subject to the rule than EPA assumes and these facilities have larger cooling systems and higher associated costs than natural gas combined-cycle facilities. In addition, the EPA analysis assumed that a large proportion of new facilities would use recirculating cooling systems, minimizing the incremental costs of compliance with the proposed section 316(b) rule. This proportion may not be the same for the larger estimate of new plants.

The results of the re-analysis have significant implications for future energy supply. The analysis shows that the reach of the § 316(b) rule will extend across a significant market share of new steam cycle generating plants. The complex regulatory processes in the proposed rule will likely lead to additional delays in bringing new electricity supply on line. In deregulated electricity markets, delays in supply expansion can lead to higher electricity prices to consumers in the short-term.

To rectify the flaws in the analysis, we reiterate the following five minimum recommendations made in EEI's November 2000 comments so that the EPA analysis of potentially affected new facilities can be made more representative and accurate.

1.The revised analysis should be based on the most recent update of the RDI database available. (However, as presented later in this document, and due to limitations in the latest update of the RDI database and an analysis of more representative data of proposed new facilities, several sources of data need to be synthesized and analyzed if an accurate picture of planned facilities is to be presented).
2.The screening analysis should be applied to new plants coming on-line over a longer time period than the three-year period used in the initial analysis. The analysis should consider a ten-year range if possible. The consideration of broader time period would help mitigate the problems of technology and geographic bias in the data.
3.The sub-sample of plants including information on planned cooling water systems needs to be significantly expanded. The limited number in the initial EPA analysis appeared to result in a significant underestimate. The database can be expanded through telephone surveys of selected states, or of developers with large portfolios of planned projects, or both.
4.The extrapolation of the screening results over the 20-year period needs to reflect recent energy market trends in electricity demand growth, fuel prices and economic growth.
5.There will always be some degree of uncertainty in the estimates. This should be addressed by developing at least two scenarios, leading to a lower bound and upper bound estimate. This will result in a much better estimate of the costs (and ultimately net benefits) of the proposed § 316(b) rule.

EEI commissioned a separate analysis of planned new generating capacity to respond to EPA's request for information on the applicability of the proposed rule to planned new generation facilities and the design of planned new facility cooling water intake structures. EEI sought the input of Energy Ventures Analysis Inc., ("EVA"), a firm that specializes in projecting energy supply for clients such as North American Electric Reliability Council ("NERC").

In its report (See, EVA, Inc., Characterization of New Powerplant Development and the Potential Affect of EPA's § 316(b) Regulations on New Powerplant Development, June, 2001, Appendix B)

EVA identified 403 natural gas combined-cycle projects that will likely be constructed in the next five years. These projects have a total capacity of over 230,000 Mw. To characterize the unit cooling system designs and water sources for these units, EVA contacted the top 20 developers of natural gas fired new capacity and was able to substantiate information on approximately 62 projects. As of June 18, 2001, results indicate that:

*Overall, 57-84% of the new natural gas combined cycle plants are potentially affected by EPA's final § 316(b) regulations. This result is significantly different from EPA's 15% initial estimate contained in the NODA.
*27 percent of the planned projects indicated that they were redesigning their systems to specifically avoid using navigable waters in order to preclude the permitting problems and delays associated with the proposed § 316(b) standards.

In the NODA, EPA asks for information about new coal-fired steam electric generating facilities (66 Fed. Reg. 28,856 col. 1-2). There are good reasons to believe that EPA has seriously underestimated the number of new coal-fired electric generating facilities likely to be built in the years 2001-2020. To begin with, EPA has assumed there will be no new coal-fired plants at all from 2002-2010, even though the updated NEWGen database shows 17. Other sources of information strongly suggest that an even greater number of coal-fired plants are likely to be built both from 2001 to 2010 and thereafter. A report prepared by EVA in March 2001 shows that 40 coal-fired power plant projects, totaling 20,860 MW, are likely to be built between 2000 and 2013. (See EVA Inc., Tracking the Boom of New Power Plants in the U.S., March 2001, Appendix C). The more recent work done by EVA for purposes of responding to this NODA, identified 26 coal-fired projects (over 13,000 MW) that have been announced. At least 15 of these facilities are likely to be covered by the requirements of §316(b). Even information this recent probably is outdated, given the rapid pace at which energy developers are planning new projects and responding to market demands. EVA concluded that based on its experience and preliminary data, anecdotal evidence indicates that EPA use of 44-59% of coal projects being affected will significantly underestimate the affected coal unit population. Taken together, this information clearly demonstrates the need for EPA to take a hard look at its assumptions and to use all available data sources to develop more accurate projections.

Other information, such as the emphasis the National Energy Policy Group report places on pursuing additional coal-fired generation, suggests that EPA's projections on the number of new facilities likely to be affected by the proposed rule are low (See NEPG Report, p. 5-13-15). The report of the Vice President's Task Force on National Energy Policy stated that there was a need to build 1,300 to 1,900 new power generation plants over the next 20 years. This statement was based upon projections prepared by the DOE Energy Information Administration. There are uncertainties inherent in any projection, but most analyses would support that this projection lies within a reasonable range of expectations. There are other forecasts (both government and private) that contain plausible projections greater and lesser than estimate. The underling details supporting the projection contained in the task force report show the following:

	# of plants	GW
Natural gas combined cycle	1205	362
Coal	73	22
Other	31	10

EPA’s projections of both coal and non-coal steam generation are inconsistent with these estimates and will lead to an underestimate of the costs of their proposed standards.

EPA Response

EPA has considered each of the analytic issues raised by the OnLocation and EOP Group analysis, submitted by the commenter.

Number of New Facilities: First, EPA disagrees with the commenter's claim that the RDI database is outdated, inaccurate, and contains a number of geographic and technological biases. For an in depth discussion of these issues please see section 1 of EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113). Second, EPA disagrees with the commenter's claim that a non-representative sample of plants was used to estimate the number of facilities affected by the final rule. For an in depth discussion of this issue please see section 2 of EPA's response to Appendix A of EEI's NODA comments. Third, EPA disagrees with the commenter's claim that the AEO forecast led to an underestimate of the total number of affected facilities. For an in depth discussion of this issue please see section 3 of EPA's response to Appendix A of EEI's NODA comments. For more information on EPA's projection of new facilities, please see Chapter 5 of the Economic Analysis document and response to comment 316bNFR.042.003 (comment category 8.1).

Facility Costs: EPA is confident in the methodology used to estimate the costs incurred by the affected facilities. For the final rule EPA used the best data available. Specifically, EPA used RDI's NEWGen Database, February 2001, EPA's section 316(b) industry survey of existing facilities; and EIA's Form EIA-860A and 860B databases to determine the baseline characteristics of the new plants. The baseline characteristics determine the additional technology required to comply with the rule and therefore facility compliance costs. Engineering unit cost estimates were utilized to estimate the cost of compliance.

Initial Project Financing: EPA disagrees with the claim that the final rule could lead to higher interest rate costs of initial project financing. EPA has considered the uncertainty in the financing of new plants. EPA economic analyses have shown that the costs and economic impacts of the final New Facility Rule will be insignificant and thus will not impact project financing. EPA also received information for the NODA as part of the industry approach, that financing will be less expensive with a rule that contains a fast track for permitting. To account for the uncertainty, however, EPA conducted a sensitivity analysis on the length of the amortization period, which showed an insignificant increase in economic impacts. For a full discussion of the sensitivity analysis please see Chapter 7: Economic Impact Analysis of the Economic Analysis document.

Delays and Energy Supply Implications: The commenter cites potential delays as a result of the rule, and implications for future energy supply. See response to comment 316bNFR.512.003.

Minimum Recommendations: EPA has considered each of the five recommendations for revision

provided by the commenter. Since the proposal, EPA has updated and expanded their research in order to reflect the most recent data available. For a complete discussion of each of the five recommendations made, please see section 4 of EPA's response to Appendix A of EEI's NODA comments.

EVA Report: EPA has reviewed Energy Ventures Analysis's (EVA) characterization of new power plant development (submitted as Appendix B, coded as comments 316bNFR.525.201 through 316bNFR.525.203). Please see response to these comments for a full discussion regarding the methodology utilized by EVA, and their results.

Coal Facilities: EPA has updated and revised the forecast of the number of new coal facilities subject to the final rule. For the final rule analysis, EPA used capacity additions from the AEO2001, which projects more coal capacity additions (21.8 GW) compared to the AEO2000 (17.2 GW), which was used for the proposal analysis. The AEO2001 also projects coal additions earlier than the AEO2000 did, with 18.5 GW (or 85 percent of the 20-year forecast) projected between 2001 and 2010. At the request of the U.S. Department of Energy, EPA also conducted a sensitivity analysis related to new coal capacity. Based on information provided by DOE, EPA increased the coal capacity additions expected between 2001 and 2020 from 21.8 GW to 30 GW. This sensitivity analysis resulted in the addition of 13 new coal facilities, 5 of them in-scope of the final rule.

A second EVA report, "Tracking the Boom of New Power Plants in the U.S." (submitted as Appendix C but not coded) contends that 20,860 MW of coal-fired projects are expected between 2000 and 2013. EVA acknowledges that 77 percent of this capacity has only recently been announced and is "expected to be highly ‘fluid' as to their status over the next several months." Even assuming that all of this new capacity will be built, this number is very close to the AEO2001 projection of 19,380 MW used by EPA (and lower than the assumption used for the sensitivity analysis). EPA therefore believes that the EVA report supports EPA's analysis for the final rule. EPA also evaluated the statement that 26 coal-fired power plants coal-fired power plants currently are planned for development, with at least 15 of them likely to be covered by the requirements of §316(b). See response to comment 316bNFR.525.202.

Other Information: EPA recognizes that there are multiple projections of both future capacity and facilities, such as the Vice President's Task Force on National Energy Policy which the commenter cites. However, EPA believes the AEO2001 the most accurate energy forecast available. The Annual Energy Outlook (AEO) is published annually by the Department of Energy's Energy Information Administration (EIA) and presents forecasts of energy supply, demand, and prices. These forecasts are based on results generated from EIA's National Energy Modeling System (NEMS). The NEMS system generates projections based on known levels of technological capabilities, technological and demographic trends, and current laws and regulations. Other key assumptions are made regarding the pricing and availability of fossil fuels, levels of economic growth, and trends in energy consumption. The AEO projections are used by Federal, State, and local governments, trade associations, and other planners and decisionmakers in both the public and private sectors. For additional information regarding EIA's forecast please see Assumptions to the Annual Energy Outlook 2001 (AEO2001) With Projections to 2020. (DOE/EIA-0554(2001)), published in December 2000.

Comment ID 316bNFR.525.022

Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

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Estuaries and Tidal Rivers

EEI continues to maintain that the designation of all estuaries and tidal rivers as sensitive areas that require additional protection is inappropriate. There is wide variety in biological sensitivity among and within estuaries and tidal rivers. Moreover, the assumption that the relatively higher density of larvae, eggs, or fish in estuarine environments translates into a greater potential for an adverse environmental effect is an oversimplification. There are known biological compensatory responses that offset substantial levels of human-caused mortality. EEI endorses the comments submitted by EPRI on this issue.

EEI also endorses the comments submitted by UWAG. In particular, UWAG notes that EPA's conclusions regarding the sensitivity of estuarine ecosystems to CWIS is based on a small selection of high-profile cases that are not representative and likely biased in favor of EPA's position. We support their contention that a broader study of a representative sample of CWIS effects in estuarine environments could lead to a much different conclusion.

Perhaps most importantly, EEI notes that the issue of the appropriate treatment of estuaries and tidal rivers is made moot by the two-track approach. The level of protection provided by the track one technology is sufficiently conservative to be protective in all waterbody types. Where this is not the case, track two provides the opportunity to select an appropriate technology based on actual site-specific factors that avoid the oversimplification inherent in the EPA's approach.

EPA Response

See responses to comments 316bNFR.024.003, 316bNFR.039.010, 316bNFR.056.035, 316bNFR.524.012, 316b, and 316bNFR.524.016.

Comment ID 316bNFR.525.023

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

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Littoral Zone

While the EPA seems to be indicating some discomfort with the term “littoral zone” in the context of these proposed standards, it continues to cast about for other terms to capture the same concept of areas of heightened sensitivity. EEI maintains that attempting to establish such a definition at a national level is arbitrary and will lead to equally arbitrary imposition of standards. The factors that define which areas are biologically important in a given waterbody are too varied to be easily captured in a one-size fits all definition.

Again, the need for a separate standard for littoral zones is obviated by the two-track approach for the same reasons mentioned in the estuaries and tidal rivers discussion.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.525.024

Subject Matter Code 10.01

Regulatory Framework Options

Author Name C. Richard Bozek

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Other Waterbody Types

This same logic holds true for all other water body types, including those, such as fresh-water rivers and streams, where less stringent standards may be warranted. The two-track approach provides a technology solution that is likely to be protective in all waterbody types, and provides the flexibility to seek greater or lesser control in those areas where the track one level of protection is inappropriate.

The only exception to this is in the case of waters that are not designated for aquatic life. EEI supports the exemption of such waters from the standards. As UWAG appropriately states in their comments, for those few sites that may fall under this exemption, "it would be senseless to require expensive technology to protect fish that do not exist." If excepted waterbodies were later redesignated to support aquatic life, those waterbodies would fall under the reach of § 316(b) at that later time.

EPA Response

EPA agrees that the two-track approach provides a technology solution that is likely to be protective in all waterbody types, and provides the flexibility to seek greater or lesser control in those areas where the Track I level of protection is inappropriate.

Since the two-track approach allows for consideration of site-specific conditions EPA does not expect facilities to have to install "expensive technology to protect fish that do not exist." New facilities will be able to implement technology most appropriate and economically viable for their site and set of circumstances to meet the requirements of Section 125.84.

Comment ID 316bNFR.525.025

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name C. Richard Bozek

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EPA is considering whether to include a definition of adverse environmental impact in the final rule and, if so, whether to use a population endpoint or an alternative based on the number of entrained and impinged organisms. EEI supports the inclusion of a definition of AEI and maintains that a definition based on potential impact on the population is the only biologically meaningful interpretation of AEI.

A reasonable understanding of AEI makes track two in the described alternative much easier to implement, since the endpoint against which technologies will be measured is clearer.

Counting numbers of lost fish or other organisms is not meaningful as a means of measuring environmental impact for at least two reasons. First, the number of organisms lost does not tell us whether there has been serious harm to the structure and functioning of the ecosystem. Second, natural aquatic ecosystems compensate for the loss of individual organisms through increases in growth, fecundity, and survival. It is impossible to judge the extent of any impact on the environment without understanding the size and dynamics of the entire population.

There is a broad body of literature, well-understood methods and models for determining effects of human induced mortality on fish populations. This body of knowledge forms the basis of the fisheries management profession. These methods and models also continue to improve over time. As they do, so will our ability to understand whether any effects of CWIS are in fact environmentally adverse.

The term “recurring and non-trivial,” on the other hand, is arbitrary and likely to be confusing to both facility developers and permitting authorities. Disputes over proper interpretation of this term could easily result in further unwarranted delay of power plant development.

UWAG’s comments contain a detailed review of the information provided by EPA in the NODA on environmental impacts of CWIS, entrainment and impingement generally, and alternative methods for estimating population effects. EEI fully supports UWAG in these comments.

EPA Response

EPA did not accept the industry two-track in full (see the preamble to the final rule). After further review, EPA elected to establish technology-based performance requirements in the final rule, based on a two-track approach, that reflects the best technology available for minimizing the adverse environmental impact of a cooling water intake structure. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as “proportional-flow requirements”). It also requires the permit applicant to select and implement design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish. These design and construction technologies may be modified by the permit director in subsequent permits if the original design and construction technologies do not meet the applicable requirements in

§125.84 of today’s rule, or if such modifications are necessary because of the effects of multiple intakes on the same waterbody, seasonal variations in the aquatic environment, or the presence of regionally important, threatened, or endangered species. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I. Track II also requires the applicant to meet the same proportional flow requirements that apply in Track I. Because EPA is adopting a technology-based approach that establishes requirements that minimize entrainment and impingement as best technology available for minimizing environmental impact, there is no need to examine and debate the environmental significance of cooling water intake structures prior to making permit decisions. This is particularly important for new facility permitting. Also, please see responses to comments 316bNFR.507.004 (AEI), 316bNFR.022.004 (speedy permitting), 316bNFR.068.015 (compensation), 316bNFR.536.013 (recurring and non-trivial impacts) and section VI.B.2 of the preamble for today's rule.

Comment ID 316bNFR.525.026

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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EPA requested comment on the energy consumption of dry and hybrid cooling towers compared to wet cooling. To some degree, this question is academic since it is not likely that dry cooling is a technically viable option throughout most of the United States. The effectiveness of dry cooling systems is heavily dependent on ambient temperatures and humidity – more specifically, wet and dry bulb temperatures. While these cooling systems may be effective in some parts of Europe, in general, the climate of the United States is simply not amenable to using this technology as a uniform national requirement.

The energy penalty associated with a given cooling technology is a function of two main factors. First, energy is consumed in the operation of the technology itself. This includes the running of pumps, fans, and other associated components. The electricity needed to operate these components means that a greater amount of fuel will need to be burned to produce the same amount of electricity from the plant. Second, the efficiency of the cooling system affects the efficiency of the turbine itself. The purpose of the cooling system is to ensure that the air temperature at the outflow of the turbine is sufficiently lower than the temperature of the steam passing through the turbine to create the vacuum necessary for the turbine to operate. Different cooling systems have different efficiencies. All else being equal, once-through systems are the most efficient, wet recirculating systems are less efficient and dry cooling systems are the least efficient of the three. The Department of Energy is conducting a study of the energy penalty differential between wet and dry cooling that we understand will be provided to the EPA in early July 2001.

EEI does not support any requirement to install dry cooling towers as a means of complying with the requirements of § 316(b), either as a prerequisite for fast track approval or as a best technology. In addition to the added energy penalty associated with dry cooling, which EPA has not included in its analysis of the impacts of the proposed rule, wet recirculating cooling is environmentally protective in all but the most extreme cases to guarantee that no adverse environmental impact occurs. A requirement to install dry cooling will lead to increased expense, less efficient operation, significant energy penalties and will result in other undesirable environmental impacts such as increased air pollutant emissions from new facilities.

EPA Response

See response to comments 316bNFR.501.024 and 316bNFR.524.046 for a discussion of energy penalties of dry cooling towers.

See response to comment 316bNFR.206.014 and Chapter 2 of the Technical Development Document for a discussion of air emissions from dry cooling.

See responses to comments 316bNFR.206.014 and 316bNFR.206.013 for discussions of the economic considerations of dry cooling.

With respect to EPA's decision to base the requirements of the final rule on wet cooling, see the preamble to the final rule. There, EPA discusses the relative merits of wet versus dry cooling in terms of impingement and entrainment.

See response to comments 316bNFR.501.024 and 316bNFR.524.046 for a discussion of the DOE draft energy penalty study for retrofitted cooling towers.

Comment ID 316bNFR.525.027

Subject Matter Code 2.1

Clean Water Act Requirements

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Maintain States' authority to make decisions. A fundamental principle of the Clean Water Act is that management of water resources is primarily the responsibility of State and local governments. It follows that the appropriate Federal role in establishing programs for States is to adopt rules that maximize the States' discretion to manage their own resources. The two-track alternative would provide a flexible and defensible mechanism that would allow states to best protect the waters under their jurisdiction and should be the basis for any final decision by the Agency.

EPA Response

EPA describes the rationale for selecting the approach of the final rule, and the rationale for rejecting the industry's two track approach, in the preamble to the final rule. EPA believes the final rule strikes the right balance between the need for certainty for the regulated community and the states, especially for new facilities, with some flexibility where performance in terms of reduction in impingement mortality and entrainment is comparable to that achieved by meeting track 1 requirements.

Comment ID 316bNFR.525.028

Subject Matter Code	23.6
Conflict with Administration's New Energy Initiative	

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The proposed rule has a greater potential to have an adverse energy supply impact than estimated by EPA.

Electricity plays an increasingly important role in the nation's economic growth. More and more, electricity is the preferred energy form to drive productivity increases and sustain economic growth while minimizing adverse environmental effects. Furthermore, electricity and energy policy has long included a concern for the environmental implications of energy supply, distribution and use initiatives.

EPA Response

EPA recognizes the important role electricity plays in the nation's economic growth. However, EPA believes that the final section 316(b) New Facility will not adversely affect energy supply. For more information, see Chapter 9: Other Economic Analyses and EPA's response to comment 316bNFR.512.003 above.

Comment ID 316bNFR.525.029

Subject Matter Code	21.0
	Cost/Benefit Analysis

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As already discussed, EPA underestimated the number of facilities that will be affected by the new rule and the costs rule will impose. Again, EEI maintains that EPA must redo its economic analysis and conduct a benefits assessment. Without this work, EPA simply will not have met its statutory duty to propose regulations that would minimize adverse environmental impact.

EPA has indicated that it may change its estimate of the number of facilities likely to be covered by the proposed standards based on newer information but has not yet made that information or reanalysis public.

Similarly, EPA's cost projections for closed-cycle cooling towers are inaccurate and understated due to the flaws in calculating the capital costs, O&M costs and dry cooling costs of constructing and operating a cooling tower. Furthermore, EPA did not consider other costs such as power costs and other environmental costs.

Regarding capital costs, EPA makes two critical flawed assumptions. First, EPA has significantly understated the costs of a cooling tower by considering only the cost of the cooling tower without the additional cost of other necessary cooling system equipment such as wiring, foundations, noise attenuation treatment, the cost of construction and other equipment. In addition, EPA's tower cost multipliers for wet cooling towers is questionable. EPA assumes that the cost factor of $30-$50/gallons per minute ($/gpm) is constant for small towers and decreases for larger towers. These assumptions are not consistent with a number of engineering texts.

With respect to O&M costs, EPA assumes that O&M costs of 5 percent of capital costs decrease to 2 percent of capital costs due to economies of scale. To support this assumption, EPA focused on chemical treatment costs. However, contrary to EPA's assumption, data from almost two dozen power plant cooling systems demonstrate the opposite ? that chemical treatment costs increase with an increase in recirculating cooling water flow.

EPA Response

EPA disagrees with the commenter's argument that the analysis underestimates the number of new facilities and therefore underestimates costs. EPA has addressed this issue in depth in responding to other comments. Please see EPA's response to Appendix A of EEI's NODA comments (316bNFR.525.101).

EPA disagrees with the comment that a benefits assessment is required. The final rule reflects these revisions. Further, The total annual cost of the final rule is relatively low, less than $50 million per year, and thus EPA is not required to complete a formal benefits analysis under Executive Order 12886.

EPA disagrees with the comment that the costs projections for closed-cycle cooling towers are

inaccurate. See response to comments 068.328, 068.329, 068.330, 068.332, and 524.049.

EPA has considered the commenter's claim that EPA did not include the energy costs of operating cooling towers in it's analysis. In response, EPA has included the energy penalty of operating pumps, fans, and other equipment associated with cooling towers in the final analysis. For a more complete discussion of costs associated with the final rule please see Chapter 6 of the Economic Analysis.

EPA disagrees with the comment that environmental costs of operating closed-cycle cooling towers have not been considered. EPA has considered these costs and believes that the technologies determined to be BTA have acceptable non-aquatic environmental impacts. The non-aquatic environmental impacts are associated with increased air emissions (SO2, NOX, CO2, and Hg) resulting from cases where facilities with once through cooling systems are required to install recirculating systems with cooling towers. The increased SO2, NOX, CO2, and Hg attributed to facilities that would be required to install wet cooling towers in lieu of once-through cooling systems is negligible in comparison to the total annual air emissions from new power plants.

Comment ID 316bNFR.525.030

Author Name C. Richard Bozek

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Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Although dry cooling systems are not required as part of the proposed § 316(b) rule, they would be required in the "zero flow" regulatory alternative considered by EPA. As such, EPA calculated costs for dry cooling systems. However, there are important flaws in EPA's analysis. EPA attempts to make a direct cost comparison between dry cooling systems and wet cooling systems but does not provide cost equations or curves for dry cooling. EPA implies, though, that it relied on similar curves and flow volumes used for wet cooling towers. If this is in fact true, this methodology is fundamentally flawed because there is no cooling water flow in dry cooling towers. Therefore, there is no equivalent to the $/gpm factor used to calculate the costs of a wet cooling tower. This objection to EPA's methodology also extends to EPA's assumption that O&M costs for wet cooling towers are related to O&M costs for dry cooling towers. There is no foundation for this assumption. More detailed analysis should be performed before making such an assumption.

EPA Response

EPA did not adopt dry cooling as the technology-basis for the requirements of the rule for the reasons discussed in Section V.C of the preamble to the final rule. See response to comment #316bNFR.368.010.

Comment ID 316bNFR.525.031

Subject Matter Code	21.0
	Cost/Benefit Analysis

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To truly estimate the cost and benefits of the proposed rule, EPA must consider power costs and other environmental costs. Closed-cycle cooling towers reduce the performance of generation facilities by increasing auxiliary power loads and reducing the efficiency of the steam turbines through turbine backpressure. This may result in reduced capacity requiring replacement power from other sources and increased fuel requirements resulting in increased costs.

Finally, EPA considers a very limited range of technologies and modifications when evaluating options to reduce impingement and entrainment, and offers inadequate rationale for excluding many effective technologies.

The likely number of facilities affected by this rule is far greater than EPA suggests. When this is weighed with the fact that the electric power market is changing at an unprecedented pace at the same time when there is a substantial growth in the demand in for electric power, it is very clear that an "optimized" solution for the environment, energy policy and economic reasons is required. Only a method that will maximize the net benefits and minimize the costs is appropriate in this context. EPA owes the public a thorough analysis of the costs and benefits of the rule using a framework that allows for optimized decisionmaking and expenditures.

EPA Response

EPA has considered the comment that environmental and energy costs of operating cooling towers should be in the analysis of the rule. In response, EPA has included the energy penalty of operating pumps, fans and auxiliary equipment associated with cooling towers in the final analysis. For a more complete discussion of costs associated with the final rule please see chapter 6. With regard to environmental costs, EPA has considered these costs and believes that the technologies determined to be BTA have acceptable non-aquatic environmental impacts. The non-aquatic environmental impacts are associated with increased air emissions (SO2, NOX, CO2, and Hg) resulting from cases where facilities with once through cooling systems are required to install recirculating systems with cooling towers. The increased SO2, NOX, CO2, and Hg attributed to facilities that would be required to install wet cooling towers in lieu of once-through cooling systems is negligible in comparison to the total annual air emissions from new power plants.

EPA disagrees with the comment that it has considered a very limited range of technologies and modifications when evaluating options to reduce impingement and entrainment, and offers inadequate rationale for excluding many effective technologies. EPA considered and analyzed several technology-based regulatory options to determine the best technology available for minimizing adverse environmental impact for new facilities (see comment 316bNFR.068.337).

EPA disagrees with the comment that the analysis underestimates the number of facilities affected by the rule and that a benefits analysis is required. EPA has addressed these issues in depth in

responding to other comments. Please see EPA's response to Appendix A of EEI's NODA comments (316bNFR.525.101) for a detailed explanation of EPA's position on comment regarding the underestimation of affected facilities.

Comment ID 316bNFR.525.032

Subject Matter Code	19.2
Baseline Biological Characterization Study	

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Potential for delay to affect energy supply and reliability

EPA requested comment on its proposed requirement for a "source water baseline biological characterization" based on at least one year of preoperational biological monitoring. EPA revised its estimates of the cost of conducting this study upwards to from $8,000 to $70,000 (depending on water body type). Information based on recent efforts to conduct such a study by EEI members suggests that these estimates are still between 5 and 50 times too low. One EEI member calculates the cost of recent studies at between $300,000 and $400,000 apiece.

However, the potentially larger cost associated with this requirement is the potential delay in bringing new capacity on line. This proposed regulation comes at a time in the electric utility sector when new facility planning and construction schedules are necessarily compressed (2-3 years in many cases), competition is fierce, and the industry is struggling with concerns over energy supply consequences. All of these realities stem from the need to bring power on-line to fuel the growing U.S. need for electricity.

Because of the need to design, obtain approval for, and analyze the results of such a study, the actual time necessary to conduct a one-year source water baseline biological characterization is closer to two years. This requirement applies to all facilities that will have a CWIS, whether or not they install all of the technologies required by the EPA's proposal.

While implementation of some of the activities associated with this study may come to overlap with other permitting requirements in the long term a two tear study process is almost certain to cause some delay in design and construction of new facilities, contrary to the National Energy Policy's directives to streamline permitting processes. If the source water baseline biological characterization actually requires changes in design – which presumably it could or it serves no purpose – the potential for delay is even greater. At a minimum, facilities that have not yet begun construction but that are scheduled to do so in the next two years will face unavoidable delay as a result of this requirement. According to the information provided to EEI by EVA, between 114 and 264 facilities -- with a combined capacity of 68,099 to 152,179 megawatts -- may commence construction in the next three to five years. Since the EVA database, like RDI's NewGen, consists of announced projects, these projects are heavily weighted toward projects in the earlier part of that five-year period. According to EVA between 56 and 68 percent of these facilities could be affected by the proposed section 316(b) standards.

The time delay and costs implications of the proposed rule comes at a time when parts of the country are experiencing severe shortages in electricity supply and bringing new capacity on line is critical. In the short term, new capacity delayed by this rule will have to be made up through the purchase of power on the spot market. If insufficient power is available to meet these shortfalls, reliability of the energy supply will become an issue.

One EEI member submitted information that suggests that a one-year delay in commencement of operation of a combined-cycle plant reduces the net present value of that project by nearly 40 percent (over $5 million in this instance).

EPA Response

EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicant must conduct a considerably more rigorous study if they seek to demonstrate that alternatives to the Track I requirements will equivalently reduce impingement and entrainment at a site. EPA has revisited the cost estimates for monitoring based on revisions to the final rule, and those costs are documented for the record in the NODA.

Comment ID 316bNFR.525.033

Subject Matter Code EXIST

Existing Facility Rule

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Application of proposed standards to existing sources

To fully understand the effects of EPA's proposed standards for new facilities, one must understand that any final standards will have the potential to set a precedent that drives decisions with respect to the forthcoming rulemaking for existing sources.

EEI is in the process of conducting a study to generate rough estimates of the cost associated with applying the proposed requirements contained in the EPA's new facility proposal to existing facilities. This study is based on relatively conservative interpretations of the standards to avoid overstating costs.

Preliminary estimates from that study indicate that application of the proposed standards to existing sources would:

*result in additional costs to the industry in excess of two billion dollars per year (with a present value of nearly $30 billion) and;
*lead to energy penalties associated with retrofit of cooling towers (disregarding any energy losses during shutdowns necessary to carry out such a retrofit) of approximately 16 million megawatt hours; and
*result in an increase in air emissions of carbon dioxide of approximately 1.9 -- 2.9 million metric tons per year.

While the Agency is under no legal obligation to consider these issues, it is important that EPA understands the magnitude of the potential impacts of this rule as the Agency examines alternative compliance approaches.

EPA Response

Today's final rule applies only to new facilities. See the preamble to today's final rule.

Comment ID 316bNFR.525.034

Subject Matter Code	23.6
Conflict with Administration's New Energy Initiative	

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NEED TO DEVELOP A STATEMENT OF ENERGY EFFECT

On May 18, 2001, President George W. Bush signed Executive Order No. 13211 requiring Agencies to prepare a Statement of Energy Effect for any regulation that is significant under Executive Order No. 12866 and has an adverse effect on energy supply, distribution, or use. The proposed cooling water intake structure rulemaking clearly meets this definition.

Under Executive Order No. 12866, "Significant regulatory action" means any regulatory action that is likely to result in a rule that may:

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive order.

Given the number of facilities likely to be affected by the proposed standard, it is likely that the standard will have an annual effect on the economy in excess of $100 million. Moreover, the standard raises “novel policy issues” both because the delay in bringing new electric generating capacity on line is inconsistent with the President’s priorities expressed in the National Energy Policy, and because the proposed standard would remove a program that has been implemented by the States for decades and replace it with a one-size-fits-all national standard.

It is also clear that the standard has the potential to have an adverse impact on energy supply, particularly on the construction of new capacity in the short term. To the extent that these standards cause developers to modify their behavior to avoid the procedural requirements of these standards in such a way that is incompatible with the development of new coal-fired capacity, these standards endanger the ability to pursue the fuel diversity that is a cornerstone of the National Energy Policy.

Executive Order No. 13211 also requires that a Statement of Energy Effect examine reasonable alternatives and their effects on energy supply, distribution, and use. The two-track approach is clearly a reasonable approach that has the potential to mitigate many of the adverse energy effects associated with the EPA’s proposed standards.

EPA Response

EPA disagrees with the commenter that the section 316(b) New Facility rule is a "significant energy action." EPA analyzed the potential energy effects of the rule and determined that the maximum reduction in available energy supply will be 100 MW. EPA believes that the estimated reduction in available energy supply as a result of the final section 316(b) rule does not constitute a significant energy effect.

EPA also disagrees with the claim that the rule will have an annual effect on the economy in excess of $100 million. EPA's analysis shows that the total annualized cost of the final rule is relatively low. See Section X.C (Unfunded Mandates Reform) of the preamble to the final rule.

For more information on EPA's compliance with Executive Order 13211, see Chapter 9: Other Economic Analyses and EPA's response to comment 316bNFR.512.003 above.

Comment ID 316bNFR.525.101

Subject Matter Code	21.2
	Electric Generation Sector

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This paper presents the results of an analysis conducted by OnLocation, Inc. and the EOP Group, Inc. of the number of new generating facilities that would be subject to the EPA proposed §316(b) rule. The purpose of this analysis is to provide an estimate of the number of new generation facilities (plants) subject to the rule, and to provide the basis for further analysis of the total economic costs of the proposed rule.

The methodology employed in this analysis was to replicate the analytical approach used by EPA for purposes of identifying problems in the analysis. Where problems were identified, the implications were assessed by applying either updated information, or more appropriate assumptions than those used by EPA. This methodology allows for full transparency in the comparison of the EPA estimates with the results of this re-analysis.

The re-analysis reveals that EPA significantly underestimated the number of new plants that would be subject to the §316(b) rule. The underestimate resulted from the use of a database that was limited in scope, creating potential biases in the results. These biases were compounded by extrapolating the analysis over a 20-year period. A revised estimate, correcting for the limitations and biases in the initial database, and using revised energy and economic forecasts for extrapolation purposes, results in an estimate 209 new plants, over five times the EPA estimate of 40 new plants subject to the rule.

The higher estimate of the number of plants subject to the §316(b) rule has two significant implications. First, the higher estimate shows that the §316(b) rule will apply to a much greater share of new electricity generation than previously thought. The estimate of 209 plants represents 62% of the total number of projected new generating plants with steam cycles for the period 2001-2020. Second, the higher estimate of number of plants subject to the §316(b) rule will greatly affect the economic impact of the rule. Because of differences in the assumptions regarding the size of plants, type of technology and type of energy source, the cost impacts will be disproportionately higher than implied by the EPA estimate.

EPA Response

First, EPA disagrees with the commenter's claim that using the RDI database results in an underestimate of the number of affected facilities due to biases with the database. For an in depth discussion of these issues please see sections 1 and 2 of EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113). EPA also disagrees that extrapolating these results over the 20 years compounds the biases. For an in depth discussion of this issue please see section 3 of EPA's response to Appendix A.

Because EPA is confident in the data and methodology used for the final rule, EPA does not believe that either the number of plants estimated to be affected by the rule, or the corresponding costs are underestimated.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.102

Subject Matter Code	21.2
Electric Generation Sector	

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SUMMARY DESCRIPTION OF THE EPA ANALYTICAL APPROACH

The EPA economic analysis estimates the cost of the proposed §316(b) rule at $80 million (present value of total facilities costs) and the annualized compliance costs are estimated at $6.43 million. This cost estimate is based upon the number of plants subject to the proposed rule and the incremental cost of compliance for those plants. EPA believes that both the number of plants and the incremental compliance cost per plant are very small.

(1) EPA estimates that the number of new plants subject to the rule is only 40 plants over the next 20 years. This estimate represents only 20% of the total number of new steam cycle generating facilities projected over this period, and about 5-10% of all new generation facilities. The EPA estimate of the number of new plants is the result of a two-step analytical process – a screening analysis of a proprietary private sector database of new generating plants that have been publicly announced; followed by an extrapolation of the findings of the screening analysis to a forecast of new plants using the projections in the Energy Information Administration (EIA) Annual Energy Outlook (AEO) 2000.

(2) EPA estimates that the incremental cost of compliance for plants affected by the proposed §316(b) rule also is very small. The initial step in the EPA cost estimate was an analysis of the site-specific information available for 7 plants identified in the screening analysis of the RDI database. Of these seven projects, five planned to use re-circulating cooling systems that require relatively small quantities of make-up water. Using limited site-specific information for these seven plants, EPA assumed that incremental requirements would be relatively small and in fact five of the seven were assumed to have no additional incremental cost due to the implementation of the proposed §316(b) rule. EPA then estimated the incremental costs for a series of model plants that assumed different generating technologies and different types of water bodies. EPA extrapolated the results of the model plant estimates to a total of 33 new plants based upon a hypothetical distribution of plant types and water body types, and combined the results with the estimated costs for the 7 identified plants for a total cost estimated 40 new plants.

EPA Response

This comment accurately summarizes EPA's analysis for the proposed rule. Since the proposal, EPA has updated and expanded their research in order to reflect the most recent data available. For an in depth discussion of EPA's new results please see Chapter 5: Baseline Projections of New Facilities of the Economic Analysis document.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.103

Subject Matter Code	21.2
Electric Generation Sector	

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PROBLEMS WITH THE EPA ANALYSIS

A re-analysis of the EPA analysis, conducted by OnLocation, Inc. and the EOP Group, Inc., identifies three major problems with the EPA analytical approach. They are: (1) use of a database that contained limited information that was not representative of national trends; (2) reliance on a non-representative sub-sample of plants with information on cooling water systems as the basis for extrapolation; and, (3) underestimating the total future number of plants subject to the §316(b) rule using low energy and economic growth projections.

(1) Database Issues: The Resource Data International (RDI) NewGen database used by EPA as the starting point for its screening analysis is incomplete and outdated. Although the database used by EPA may have been the best available at the time, it has since changed substantially, reflecting the rapid changes in the market. Also, because the database is based upon announcements by project developers, the database does not contain uniform information on all new plants. As a result, the database contains several inherent biases that permeate the entire analysis and significantly affect the results.

-The RDI database has a technologic bias. It is, by its very definition, a snapshot in time of the then known plants under construction or at various stages of development. The database is driven by developers' current expectations of environmental regulations, fuel prices, local markets (acceptance of new projects – e.g., competitively open to new merchant plants), technology performance (including time to construct), technology costs and a myriad of other factors.

-EPA limited its analysis of the database to a very narrow time window. EPA limited its analysis of the January 2000 RDI NewGen database to new plants that will begin operations after 8/31/01. Almost all of the plants in the database are planned to begin operation by 2003. This data provide a snapshot for expected additions over a two-year period – transitional years in electricity markets that are not necessarily representative of the long-term future in terms of technology choice and location. As a result, the analysis relies upon a very narrow window of time as the basis for a 20-year extrapolation.

-The RDI database has a geographic bias. Because the RDI database is based on announced projects, it over represents projects in those states with public disclosure and early public participation requirements. In addition, development of new plants over the next few years appear concentrated regionally due to market conditions. A comparison of the geographic distribution of the RDI announcements relative to EIA projections shows overrepresentation of facilities in Texas and the Midwest, and under representation of projections in the Midatlantic, Florida and the Pacific Northwest.

(2) Non-representative sample of plants with cooling systems information: The screening analysis was limited to only those plants where EPA was able to obtain from state permitting authorities information on planned cooling water systems. It was assumed that plants for which no information was available

had the same patterns of cooling system characteristics. There is no statistical or other scientific basis for this assumption. A follow-up telephone survey of a sub-set of the EPA database found that this critical EPA assumption is incorrect, and resulted in an underestimate of the total number of new plants subject to the §316(b) rule.

A sub-sample of 18 projects (approximately 20% of the 94 plants screened by EPA) was selected for follow-up review. A telephone survey was conducted with both state regulatory officials as well as project developers. The survey revealed a significantly higher proportion of plants that would be subject to the §316(b) rule. The reason for this large difference was due to the fact that the project developers and the state officials provided information on more new plants than was reported in the EPA analysis. The comparison is shown in the table below.

[see original docment for table]

(3) Underestimates in the 20-year extrapolation: The EPA extrapolation of the total number of new plants subject to the rule over the 20-year period uses the AEO 2000 Reference Case forecast. The EPA extrapolated estimates for two time periods: 2001-2010 and 2011-2020. A review of the assumptions contained in this forecast showed that they do not reflect recent energy market trends. The re-analysis shows that the AEO 2000 assumptions result in an underestimate of the number of new plants subject to §316(b)

The EPA assumptions regarding the average size of plants leads to an underestimate of the number of new plants as well. For example, EPA derived an average size of 723 MW for gas combined cycle (CC) plants based on their sample of 56 plants. The average size in the more recent September 2000 RDI NewGen database for all proposed new combined cycle plants is 611 MW. By comparison, EPA assumed an average size of 800 MW for new coal plants. For the limited number of proposed new coal plants in the recent RDI NewGen database, the average coal plant size is 427 MW. EIA assumed 400 MW as the average coal plant size in its long-term forecast. By assuming a larger average size for new plants, EPA estimated a smaller number of new plants needed to satisfy projected new capacity requirements.

The Reference Case contained in the AEO 2000 forecast represents a single set of assumptions regarding future fuel prices, macroeconomic conditions and technological progress. By looking to this case exclusively, the EPA ignores the considerable uncertainty in this key element of their analysis. In fact, the reference case projections do not reflect recent market trends and result in an underestimate of the number of plant subject to the §316(b) rule. The use of the AEO 2000 High Economic Growth Case more accurately represents recent trends and would lead to a much higher estimate of the number of new plants subject to the rule.

[see original docment for table]

Because the EPA screening analysis was conducted sequentially, with the outcome of each step dependent upon the results of the previous step, the biases and errors in any given step have a compounding effect on the final result.

EPA Response

EPA has considered each of the analytic issues raised by the OnLocation and EOP Group analysis, submitted by the commenter. First, EPA disagrees with the commenter's claim that the RDI database is outdated, inaccurate, and contains a number of geographic and technological biases. For an in depth discussion of these issues please see section 1 of EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113). Second, EPA disagrees with the commenter's claim that a non-representative sample of plants was used to estimate the number of facilities affected by the final rule. For an in depth discussion of this issue please see section 2 of the response to Appendix A. Last, EPA disagrees with the commenter's claim the AEO forecast led to an underestimate of the total number of affected facilities. For an in depth discussion of this issue please see section 3 of the response to Appendix A.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.104

Subject Matter Code	21.2
Electric Generation Sector	

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RESULTS OF THE RE-ANALYSIS OF THE EPA SCREENING AND EXTRAPOLATION

The re-analysis generally followed the EPA methodology, but substituted updated information where available and used different assumptions in the extrapolation process that more closely reflect recent energy market trends. The re-estimate results in a substantially higher number of plants that would be subject to the §316(b) rule. The re-analysis provides a credible estimate of the scope of future electricity generating capacity that would be subject to §316(b) and represents a more likely outcome than the EPA estimate, which consistently underestimates the factors affecting the number of new plants.

Results of the Screening Analysis: Using the September 2000 RDI database, and applying additional information for plants with cooling water systems, results in a much higher proportion of new steam cycle plants subject to the §316(b) rule. The re-estimate indicates that 43.8% of new combined cycle plants will be subject to the §316(b) rule rather than the 12.5% estimate developed by EPA. A comparison of the derivation of the two estimates is shown in the table below:

[see original docment for table]

B. Results of the Extrapolation Analysis: The 20-year extrapolation was re-estimated using the revised proportion of plants subject to §316(b) rule. In addition, the extrapolation was adjusted to account for different assumptions regarding the size of new plants, and for different assumptions regarding demand growth for electricity as projected by the AEO2000 High Growth Case. Combining these factors yields an estimate of 209 new plants subject to the §316(b) rule as compared with the EPA estimate of 40 plants. The comparison is shown in the table below:

[see original docment for table]

EPA Response

EPA disagrees with the re-analysis conducted by the commenter. See section 2 of EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113).

EPA also disagrees with commenter's claim that the AEO High Growth Case should be utilized. EPA would like to point out that U.S. macroeconomic conditions have worsened since the analysis of the proposed rule suggesting that the use of the high growth forecast is not appropriate. For the final analysis, the EPA uses the AEO2001 reference case forecast to estimate the total number of new plants over the 20-year time period. Despite the observed economic slowdown, the projected growth rate of the U.S. economy, measured by gross domestic product (GDP), is considerably higher in the AEO2001 (3.0 percent) than in the AEO 2000 (2.2 percent) reflecting a more optimistic view of long-

run economic growth resulting in higher forecasts of energy consumption in AEO2001 than in AEO2000.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.105

Subject Matter Code	21.2
Electric Generation Sector	

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CONCLUSIONS

There are two principal conclusions that emerge from the re-analysis of EPA's analytical approach to estimating the number of new plants subject to the proposed §316(b) rule:

*Site specificity: The EPA analysis depends heavily upon interpretation of site-specific information on cooling water systems for each new generating facility. For example, EPA's estimate of the number of plants appears to be significantly underestimated because it relied upon only those plants where information on cooling water systems was available, and assumed that this data was representative of those plants where information was not available. The additional information developed as part of the re-analysis process revealed that EPA's assumption was incorrect, leading to an underestimate of the number of plants. In addition, the EPA analysis of the incremental cost of compliance for new plants subject to the rule relied heavily on site-specific judgments in order to arrive at a low incremental cost estimate. In fact, the economic analysis may have assumed a degree of flexibility in applying site-specific factors that goes beyond the flexibility afforded in the actual language of the proposed rule.

*Range of uncertainty: Estimates of the number of plants subject to the proposed rule are subject to two uncertainty factors: (1) the 20-year extrapolation is derived from the results of the screening analysis, thus any small changes in the outcome of the screening analysis will result in large changes in the extrapolation; and, (2) the extrapolation itself is subject to large uncertainties in the underlying energy and economic assumptions. Because of these large uncertainty factors, the use of a single-point estimate for the number of plants subject to §316(b) is inappropriate. Instead, the estimates of plants subject to §316(b) should be based upon two or more different scenarios that can bracket the range of potential outcomes.

EPA Response

EPA disagrees with the commenter's claim. EPA is confident in its projections of new facilities subject to the final rule. Since the proposal, EPA has updated and expanded their research in order to reflect the most recent data available. The results of EPA's final rule analysis are based upon cooling water information for 199 new greenfield and stand-alone combined-cycle facilities, compared to 56 at proposal. EPA believes that this larger number provides for a robust estimate of the characteristics of new facilities. For more information on EPA's projection of new facilities, please see Chapter 5 of the Economic Analysis document and response to comment 316bNFR.042.003 (comment category 8.1). A full discussion explaining why EPA does not agree with EEI's re-analysis can be found in EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113).

EPA recognizes that there is uncertainty inherent in any projection 20 year into the future. However, EPA maintains that it used the best and most current data available. Instead of bracketing results by

estimating several scenarios, EPA tested the sensitivity of some assumptions, including the magnitude of new capacity additions from coal and combined-cycle facilities. These sensitivity analyses are documented in the Economic Analysis document.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.106

Subject Matter Code	21.2
Electric Generation Sector	

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RECOMMENDATIONS FOR REVISING THE EPA ANALYSIS

If EPA decides to continue to base its economic analysis on the methodological approach prepared in support of the proposed rule, it is recommended that EPA revise its analysis to address, at a minimum, the following five points:

(1) The revised analysis should be based upon the most recent update of the RDI database available.

(2) The screening analysis should be applied to new plants coming on-line over a longer time period than the three-year period (2001-2003) used in the initial analysis. The analysis should consider a 10-year range if possible (1995-2005). The consideration of a broader time period would help mitigate the problems of technology and geographic bias in the data.

(3) The sub-sample of plants with information on planned cooling water systems needs to be significantly expanded. The limited number in the initial EPA analysis appeared to result in a significant underestimate. The information base can be expanded through telephone surveys of selected state regulatory staff, or of power plants developers with large portfolios of planned projects, or both.

(4) The extrapolation of the screening results over the 20-year period needs to reflect recent energy market trends in electricity demand growth, fuel prices and economic growth.

(5) There will always be some degree of uncertainty in the estimates. This should be addressed by developing at least two scenarios, leading to a lower bound and upper bound estimate. This will result in a much better estimate of the costs (and ultimately the net benefits) of the proposed §316(b) rule.

EPA Response

EPA has considered each of the recommendations proposed by the OnLocation and EOP Group analysis, submitted by the commenter. For an in depth discussion of the five recommendations please see section 4 of EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113).

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

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Subject Matter Code	21.2
Electric Generation Sector	

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SUPPLEMENTAL ANALYSES OF SELECTED DATABASE ISSUES

1. The January 2000 RDI Database Used by EPA is Incomplete and Outdated

-The RDI January 2000 NewGen database is incomplete and outdated. Using this database as the basis for identifying selected new plants and then extrapolating the results over 20 years creates estimates that are subject to considerable uncertainty. The September 2000 version of the RDI database has substantially more proposed new plants than the January version used by EPA. The use of the September 2000 database will help reduce the uncertainty in the estimates.

-For example, the several criteria applied by EPA to the January database reduced the original data set from over 450 plants to 94 plants. These criteria include: (1) new plants only; (2) located within the U.S.; (3) excludes plants without steam generators; and, (4) date of initial commercial operation after 8/31/01.

-However, a review of the September 2000 database reveals that 12 of these 94 plants do not meet the criteria based upon updated (or corrected) information in the September data -- 10 because they have been cancelled or tabled since January, and 2 others because plans for combined cycle plants have changed to combustion turbines.

-The September 2000 database contains 202 plants that meet the EPA screening criteria, more than twice the number in the original EPA analysis. The two estimates are compared below.

[see original docment for table]

EPA Response

In support of the final section 316(b) New Facility Rule, EPA used the February 2001 version of the NEWGen database. Compared to the January 2000 NEWGen database used for proposal, the newer version contains more than twice the number of new projects (941 compared to 466). EPA researched more than three times as many greenfield combined-cycle facilities (320 compared to 94) and obtained cooling water source information on almost four times the number of facilities (199 compared to 56). Of the 199 new combined cycle facilities for which cooling water data were available, EPA identified a much larger number that were in scope of the final section 316(b) New Facility Rule (57 compared to seven).

EPA would like to point out that both for the proposal analysis and for the final rule analysis, EPA used the most current data available.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter,

see Appendix A of this response to comment document.

Comment ID 316bNFR.525.108

Subject Matter Code	21.2
Electric Generation Sector	

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The EPA screening process yielded a narrow range of technology selection that does not reflect the range of future outcomes.

*The RDI database only addresses those plants publicly announced by developers and representative of current market conditions. The technology mix and fuel type likely will change considerably over time, but the EPA analysis is based upon a very narrow snapshot in time. The main technology issues include the following:

*Baseload vs. Peaking Capacity: the emphasis today on combustion turbine (CT) and combined cycle (CC) technology is based on a market preference for additional peaking capacity. This results from the fact that, in many regions, there is currently a greater proportion of baseload capacity relative to peaking capacity in the existing capacity mix. As the relative mix of baseload and peaking capacity is altered to better match market demand, a more balanced approach between development of new baseload and peaking technology will likely emerge.

*Fuel Type: The use of a single EIA forecast without consideration of the range of possible future scenarios places unreasonable emphasis on the dominance of natural gas fired CC technology. Under alternative scenarios, EIA projections show a greater reliance on coal-fired steam capacity.

*Phased Technology Deployment: Some plants may have multiple technologies that are built in phases, such as a combustion turbine completed in one year that is later converted to a combined cycle plant.

-For example, when the number of plants is tabulated by technology, there are 226 phases that meet EPA's criteria, as compared to 202 individual plants.

-By excluding all combustion turbine (CT) plants, EPA may have underestimated the total number of plants that might be affected by the rule. If CT's subsequently converted to CC would be subject to the rule, EPA has excluded all of these plants from its consideration.

*Narrow Technology Base for Screening Purposes: EPA based its determination of the percent of plants affected by the rule on 56 plants where information on the cooling water source was known, of which 55 were CC or gas cogeneration projects. This narrow range of technology became the base for the 20-year extrapolation.

[see original docment for table]

EPA Response

EPA disagrees with the commenter's claim that using the RDI database creates a technology bias.

The commenter has obviously misunderstood the use of the database. EPA only uses the RDI database to determine the characteristics of new combined-cycle plants, not to determine which technology types will be built in the future. Rather, EPA used the AEO2001 to estimate the technology mix over the next 20 years. The AEO presents a comprehensive forecasts of the electricity market, including energy supply, demand, and prices. This forecast includes requirements for baseload capacity and peaking capacity, taking into account current capacity, retirement of facilities, trends in fuel prices, and technology developments. These forecasts therefore take into account the current preference for peaking capacity but do not assume that these will last over the entire 20 year forecast period.

Regarding the commenter's contention with EPA's lack of consideration towards "phased technology deployment;" EPA can only take into account information currently available. In addition, changes to an existing facility that results in the construction of an intake structure will not be addressed under the final New Facility Rule.

Finally, EPA disagrees with the commenter's claim that EPA's screening process of the RDI database results in a narrow technology base. As discussed above, EPA only uses the RDI database to determine the characteristics of combined cycle plants. The AEO2001 forecast was used to determine the types of technology that will be utilized.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.109

Subject Matter Code	21.2
Electric Generation Sector	

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The time period of plants used as the basis for extrapolation is too narrow. The 20-year extrapolation is based upon only 2 and a half years of current plans.

*The RDI data only includes projects that have been publicly announced, which means it provides only a limited view of future capacity additions. Both the January 2000 and September 2000 RDI databases contain a small number (5% or less) of new plants that have start dates after 2003. This is shown in the table below.

*EPA screened the database for plants with an on-line date of later than 8/13/01, the date of proposed rule implementation, which further reduces the sample size. Since the primary interest is in the proportion of plants subject to the rule, not the specific plants, there does not seem to be any justification for the exclusion.

*This near term focus is likely to bias the technology choice and plant characteristics to projects that can be constructed quickly. Given the considerable uncertainty in fuel prices, demand levels and technology performance, focusing on only today's plant choices is risky.

-The opening of electricity markets to competition has created an incentive for many developers to gain market share early and at the same time potentially reap profits during the transition period.

-As a result developers may be willing to invest in additional plant enhancements, such as minimizing cooling water or buying water from local sources, in order to speed the permitting process.

-Once the market matures, the rapid deployment of capacity is not likely to carry the same degree of importance.

EPA Response

Overall, EPA disagrees with the commenter's claim that using the RDI database is inadequate due to the narrow time frame of the projects it tracks. EPA does acknowledge that the on-line date screening criteria used in the proposed rule limited the potential sample size. Therefore, in screening facilities listed in the February 2001 version of the NEWGen database for inclusion in the final analysis, on-line date was not considered.

Furthermore, EPA only uses the RDI database to determine the characteristics of combined cycle plants. See response to comment 316bNFR.525.108 above.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.110

Subject Matter Code	21.2
Electric Generation Sector	

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The RDI database has a Geographic Bias, in part, due to state reporting requirements.

*Recent plant development efforts have been concentrated in selected regions of the country due to a number of factors including competitive wholesale and retail markets, environmental permitting and regulatory requirements, and electricity demand growth.

*The RDI database is based on announced projects and may have an overrepresentation of projects in States with very public approval processes which require developers disclose their plans in detail early in their permitting process.

*Over time new plants will be needed in virtually every region of the country, not just those where developments have been announced.

*The table below shows a comparison of the relative geographic distribution of new combined cycle plants between the RDI database and the AEO assumptions.

[see original docment for table]

*The RDI data includes a much higher proportion of new combined cycle plants in the Midwest (ECAR and MAIN), Texas (ERCOT) compared to the AEO2000 projections. At the same time, there is an under representation of Mid-Atlantic (MAAC), Florida (FRCC), and the Pacific Northwest (NWPP).

EPA Response

EPA disagrees with the commenter's claim that the analysis is affected by a geographic bias in the NEWGen database. For an in depth discussion of the this issue please see section 1 of EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113).

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.111

Subject Matter Code	21.2
Electric Generation Sector	

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The geographic distribution of plants with cooling water information is significantly different from the distribution of plants subject to the proposed rule.

*The EPA screening analysis further compounded the geographic bias in the RDI database by selecting only those new plants where information on cooling systems was available.

*The geographic distribution of the 56 new plants with cooling water information is significantly different than the 94 new steam plants in the January RDI database used by EPA and different than the same set in the September version of the database.

-Almost half of the 94 new plants with steam generators are concentrated in 6 States: Alabama, Arizona, California, Florida, New York and Texas.

-The sub-set of 56 new plants is concentrated in five States: Arizona, California, Massachusetts, New York, and Washington. Only three states are represented in both lists.

*The new plants with cooling water information may be in States where water issues have greater significance, and where project developers may be less likely to propose the use of "waters of the U.S." subject to the §316(b) rule. For example, in California developers must describe water sources proposed for power plant cooling in their initial notification of intent and in their certification application must justify a choice of fresh water.

*The additional geographical bias introduced into the EPA screening analysis is shown in the table below, which depicts state-by-state distribution. For example:

-New plants in California constitute 8% of all new plants potentially subject to §316(b), but constitute 11% of the plants selected for further analysis by EPA.

-New plants in New York constitute only 6% of all new plants subject §316(b), but constitute 11% of the plants selected for further analysis by EPA.

-New plants in Texas constitute 15% of all new plants potentially subject to §316(b), but constitute only 4% of the plants selected for further analysis by EPA.

[see original docment for table]

Note: There are no proposed additions in Iowa, Kansas, North Dakota, South Dakota and Utah. Alaska, Georgia, Maine, Minnesota, Nebraska, and Tennessee each represent less than 0.5% of the number of plants.

EPA Response

EPA disagrees with the commenter's claim that the analysis is affected by a geographic bias with respect to cooling water information. In support of the final section 316(b) New Facility Rule, EPA used the February 2001 version of the NEWGen database. Compared to the January 2000 NEWGen database used for proposal, the newer version contains more than twice the number of new projects (941 compared to 466). EPA researched more than three times as many greenfield combined-cycle facilities (320 compared to 94) and obtained cooling water source information on almost four times the number of facilities (199 compared to 56). Of the 199 new combined cycle facilities for which cooling water data were available, EPA identified a much larger number that were in scope of the final section 316(b) New Facility Rule (57 compared to seven).

For an in depth discussion of the this issue please see section 2 of EPA's response to Appendix A of EEI's NODA comments (coded as comments 316bNFR.525.101 through 316bNFR.525.113).

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.112

Subject Matter Code	21.2
Electric Generation Sector	

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The EPA Extrapolation from the limited RDI data to All New Capacity 2001-2010 results in an underestimate due to assumption on technology type and average plant size.

*EPA used estimates of the average size and the technology type, taken from its screening analysis of the RDI database as the basis for an extrapolation of the number of new plants from 2001-2010. EPA then used the estimate of 73.6 GW of projected new steam generating capacity from the AEO 2000 Reference Case to derive the total number of estimated new plants for this period.

*EPA used an average plant size of 723 MW derived from the 56 new plants identified in the RDI January database. This average is higher than both the RDI September database and the AEO size assumptions. Use of the higher average results in a lower estimate of the number of new plants. Use of the AEO assumption, which is an inherent part of its forecast, yields a higher number of new plants subject to §316(b) rule. The comparison of size assumptions is shown in the table below.

[see original docment for table]

*In addition the EPA extrapolation does not consider potential diversity of technology type. EPA's extrapolation is derived from the 56 plants in the January RDI database that were combined cycle or co-generation. Both the September 2000 RDI database and the AEO include some new coal-based generating plants. These were not considered in the EPA extrapolation for the 2001-2010 period. A comparison of the distribution of new generating plants by type is shown below.

[see original docment for table]

EPA Response

EPA disagrees with EEI's assertion that extrapolation from the limited RDI data to all new capacity 2001-2010 results in an underestimate due to assumption on technology type and average plant size.

For EPA's response to assumptions on technology type, see comment 316bNFR.525.108 above.

With respect to the average plant size, EPA disagrees with the assertion that EPA underestimated the size of new combined-cycle and coal facilities.

With regard to facility size, the average size of the NEWGen combined-cycle facilities analyzed for the final rule analysis is 741 MW. While this estimate is slightly larger than that assumed for the analysis of the proposed rule, it is based on information from a significantly larger sample of facilities (199 compared to 56). EPA believes that this estimate is reasonable because it is consistent with DOE's forecast of the average size of a new combined-cycle unit of approximately 360 MW (DOE, 2000, Table 43)<fn1>. According to DOE, new combined-cycle facilities generally have more than

one unit (E-mail from J. Alan Beamon, EIA, April 6, 2001). If new facilities had two units on average, the average new combined-cycle facility would have a generating capacity of approximately 720 MW. The average size of the analyzed coal facilities is 475 MW, which is somewhat smaller than DOE's forecast of the size of a new coal facility (DOE, 2000, Table 43)<fn2>. DOE estimates that a new coal unit would be 400 MW and that a coal facility would generally have more than one unit (E-mail from J. Alan Beamon, EIA, March 29, 2001). However, using a smaller average size would result in an overestimate of the number of new coal facilities, not an underestimate. The results of EPA's analysis are therefore conservative.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

<fn1> DOE projects three types of new combined-cycle units: integrated coal-gasification combined-cycle (428 MW), conventional gas/oil combined-cycle (250 MW), and advanced oil/gas combined-cycle (400 MW). The average size of all three types is approximately 360 MW.

<fn2> DOE only projects one type of new coal unit: conventional pulverized coal (400 MW).

Comment ID 316bNFR.525.113

Subject Matter Code	21.2
Electric Generation Sector	

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The EPA Extrapolation from the limited RDI data to All New Capacity 2011-2020 underestimates the number of new plants subject to §316(b) due to average plant size and technology type.

*For the 2011-2020 period, the EPA extrapolation results in an underestimate of new plants, because of its reliance on its assumptions of average plants sizes and technology type assumptions derived from the AEO2000 Reference Case. These averages are biased as a result of the screening analysis and not consistent with AEO projections and other information.

*For combined cycle capacity EPA used an average size of 723 MW, the same as in the 2001-2010 extrapolation, which is significantly higher than either the AEO or September 2000 RDI estimate. Use of the higher average results in a lower number of new plants.

*In addition, EPA assumed that 82% of coal-fired capacity would be new plants and the remainder would be re-powering (based on a very limited sample from RDI) and that 90% of new plants would be subject to the proposed rule.

*EPA used an average size for coal plants of 800 MW, even though the average coal plant size in the September RDI database is 453 MW and the AEO forecast assumed a 400 MW average.

-In electricity markets that have moved to retail choice and deregulated assets, developers may no longer find it prudent to invest the capital required for construction of large coal plants, which suggests that the 800 MW assumption is likely too large.

*Reliance on a single forecast as the basis for a 20-year extrapolation is inherently risky and is subject to large uncertainties. For example, the AEO High Economic Growth Case shows an additional 40 GW of new steam generating capacity, with a much higher proportion of coal-fired capacity.

*A comparison of the AEO Reference Case and high growth case forecast is shown in the table below. The results show a potentially large range of outcomes in estimated coal steam capacity that likely would be subject to the §316(b) rule.

[see original docment for table]

EPA Response

For EPA's position on technology type and plant size assumptions for this rule, please refer to the response to comment 316bNFR.525.112 above.

EPA believes the AEO2001 the most accurate energy forecast available, and therefore is confident in using only a single forecast. Instead of bracketing results by estimating several scenarios, EPA tested

the sensitivity of some assumptions, including the magnitude of new capacity additions from coal and combined-cycle facilities. These sensitivity analyses are documented in the Economic Analysis document.

In response to the comment that a different AEO case may lead to a higher number of new coal plants, EPA would point out that the AEO2001 contains more coal capacity than the AEO2000, and that this capacity is projected to be built earlier. In addition, U.S. macroeconomic conditions have worsened since the analysis of the proposed rule suggesting that the use of the high growth forecast is not appropriate. However, despite the observed economic slowdown, the projected growth rate of the U.S. economy, measured by gross domestic product (GDP), is considerably higher in the AEO2001 (3.0 percent) than in the AEO 2000 (2.2 percent) reflecting a more optimistic view of long-run economic growth resulting in higher forecasts of energy consumption in AEO2001 than in AEO2000. Given the current economic climate and the fact that the final rule analysis is already based on a higher forecast, EPA did not find it reasonable to use the high economic growth forecast for this analysis.

For a comprehensive response to the issues raised within the entire Appendix A from the commenter, see Appendix A of this response to comment document.

Comment ID 316bNFR.525.201

Subject Matter Code	21.2
Electric Generation Sector	

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

The EVA Power Project Development Database was developed to closely track power supplier announcements of new power capacity for NERC and other EVA clients. Since not all suppliers (especially smaller developers of renewable capacity and small municipally owned systems) announce their plans, the database includes most but not all new planned capacity additions that may occur over the next 3-4 years.

For each capacity announcement, EVA collects data on the plant size, location, status (project permitting, financing, signed power contracts, construction status, transmission studies, EIS, etc.) and investors. The new capacity announcements have been dominated by natural gas combined cycle projects. Through June 2001, EVA has collected data on 710 natural gas combined cycle projects with a total capacity of 371,547 MW. For NERC and its power clients, these NGCC announcements are characterized into one of six categories:

Code Description

1- In operation: 69 units- 23,116 MW
2- Under construction: 139 units- 78,197 MW
3- Very Likely: In later stages of active development- Project permitted, financed and/or signed long-term contracts for output: 114 units- 68,099 MW
4- Promising but in early stages of development: 150 units- 84,080 MW
5- Unlikely: Serious problems encountered in project development and/or announcement too generic (e.g. no site selected) for project to be online within next 4-5 years- 179 units- 86,875 MW.
6- Project withdrawn or cancelled- 59 units-31,180 MW

Natural Gas Combined Cycle Plant Characterization:

EVA's characterization focuses on only the natural gas combined cycle plants that receive a likelihood rating of 2, 3, or 4. This screen eliminates both operating units and highly unlikely/cancelled units. The remaining 403 units have a total capacity of 230,376 MW. A distribution of these projects by location, capacity and online date is shown in Exhibit 1. [see original docment for exhibit]

To characterize the unit cooling system designs and water sources for these units, EVA contacted the top 20 developers of natural gas fired new capacity. These large developers accounted for roughly 143 of the listed natural gas combined cycle projects. As of June 18, 2001, ten developers accounting for 62 active projects had responded and participated in the phone survey.

Natural gas combined cycle project developers were asked the following questions:

*The type of cooling system design for each of their projects under design and active development.

*The source of the project cooling water. The respondents identified the following sources: surface

water, purchased water from 3rd party, groundwater, recycled gray water, none (air cooled), or undesignated.

*Reasons for cooling water source selection

The survey results are shown in Exhibit 2. [see original docment for exhibit] As is shown, the breakdown of projects were as follows:

*35 projects (56.5%) reported being directly or indirectly impacted by EPA's §316(b) regulations.

-18 projects planned building re-circulating wet cooling systems requiring new cooling water intake structures (CWIS) to withdraw water from waters of the U.S.

-17 projects designed their cooling systems to use alternate water sources to specifically avoid project permitting delays and/or confusion created by anticipated EPA §316(b) regulations. Developers reported their original designs included building re-circulating wet cooling systems using water withdrawn from US waters. To avoid delays, developers switched their designs as follows:

--1 project planned to purchase water from a 3rd party supplier that they thought would utilize an existing CWIS

--3 projects planned using local groundwater to meet cooling needs

--1 project planned an air cooled system

--12 projects had not decided on their final cooling system design but planned to use non-navigable waters to avoid confusion and potential project delays from impending regulations.

*17 projects (27.4%) may potentially be impacted by EPA's §316(b) regulations. This uncertainty was created because the final cooling system/CWIS design has not been finalized or because the water is being purchased from a 3rd party.

-7 projects had not made a final decision on their cooling system designs. These designs would likely be influenced by EPA's final §316(b) regulations as well as any proposed state regulation changes.

-7 projects planned to purchase cooling water from 3rd party suppliers that had existing CWIS. These projects could be affected by EPA's final §316(b) regulations if 3rd party suppliers would need to make modifications to expand intake capacity.

-3 projects were planned expansions at existing powerplant sites and would likely use the existing onsite CWIS. However, it was uncertain if modifications were needed to expand capacity.

*10 projects (16.1%) may not be impacted by the final EPA §316(b) regulations. These projects elected to use non-navigable waters for other business reasons or planned to use existing CWIS. A breakdown of these projects are as follows:

-3 projects planned to use gray recycled water

-2 projects planned air cooled systems

-5 projects planned to use groundwater

Overall, 57-84% of the new natural gas combined cycle plants are potentially affected by EPA's final §316(b) regulations. This result is significantly different from EPA's 15% initial estimate contained in the NODA. Possible explanations for EPA's lower estimate may include: (a) very limited data on cooling water usage is contained in NEWGen database that is further compounded by a bias in announcements that do not generally identify cooling water designs unless trumpeting plans to use alternate water sources, (b) no apparent attempt was made to identify sources changing CWIS designs to avoid costly project delays (27% of projects in EVA sample) because of its rule and (c) a possible assumption that projects using existing CWIS and/or purchased water (16% of EVA sample) would not be affected by final rule.

EPA Response

EPA has reviewed Energy Ventures Analysis's (EVA) characterization of new power plant development. Since the proposal, EPA has conducted additional research to obtain the most current and complete data available. EPA is confident in its estimated number of facilities subject to the final rule. In support of the final section 316(b) New Facility Rule, EPA used the February 2001 version of the NEWGen database. Compared to the January 2000 NEWGen database used for proposal, the newer version contains more than twice the number of new projects (941 compared to 466). EPA researched more than three times as many greenfield combined-cycle facilities (320 compared to 94) and obtained cooling water source information on almost four times the number of facilities (199 compared to 56). Of the 199 new combined cycle facilities for which cooling water data were available, EPA identified a much larger number that were in scope of the final section 316(b) New Facility Rule (57 compared to seven).

Furthermore, EPA would like to address several shortcomings of the EVA analysis that make it impossible for EPA to directly compare it to their own analysis.

First, EVA presents their data on a "unit" basis, making it impossible for EPA to know exactly how many plants these units comprise. Second, though EPA and EVA researched roughly the same number of facilities, 320 and 403 respectively, (assuming one unit equals one facility) EPA was able to obtain cooling water information on roughly three times as many facilities, 199 compared to 62, respectively. Based on EPA's relative success in researching the source of cooling water, EPA believes that their research presents a more accurate assessment of what type of cooling water source facilities are choosing. Third, EVA neither presented the geographic location for the 403 units which passed their screening analysis, nor the 62 units that they obtained cooling water information. Without knowing the geographic distribution it is impossible to know if their sample is evenly distributed, relative to the AEO 2001 outlook. Fourth, the facilities identified by EVA are both new (greenfield and stand-alone) and existing/re-powering facilities. Because no distinction was made between the two types, EPA is not able to directly compare their data to EVA's data. Fifth, without

actually reviewing EVA's research, EPA cannot comment on the accuracy of their research. EPA maintains that the information in the NEWGen database, coupled with the state specific research conducted regarding cooling water, is the most complete data available at the time.

Finally, EPA would like to clarify an apparent misconception by the commenter: EPA did not rely on the NEWGen database for cooling water use information but collected this information from state and other permitting authorities. Given that new plants, if they wish to begin operation, have to submit information on water use in their permit applications, EPA is confident that a potential desire of "trumpeting plans to use alternate water sources," as cited by the commenter, does not come into play in EPA's analyses.

Comment ID 316bNFR.525.202

Subject Matter Code	21.2
Electric Generation Sector	

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Characterization of Other Affected Capacity

The EPA rule would also affect numerous other power projects (outside gas combined cycle plants) that are planned and in various stages of development. These non-gas fired powerplants may also require cooling water intake structures along US waters and could be impacted by the final EPA 316(b) regulations. These projects include:

*26 Coal-fired projects (13,609 MW) are under active development. The distribution of these coal projects is provided in Exhibit 3. [see original docment for exhibit] Although EVA was unable to survey these project developers by the July 25 NODA deadline, our initial evidence suggests that most coal-fired projects would be impacted by final EPA §316(b) regulations. As EPA's NODA indicated, coal plants have historically selected wet systems using US waters. This trend should continue because of the much higher cost for alternative cooling sources. Only two projects announced plans to use dry cooling system designs that were forced by water availability problems. Although eight coal projects are being sited at existing powerplants, we have serious reservations about whether the existing CWIS could handle the large increased water requirement without some major modifications that could trigger the new rules. The remaining coal projects are located at new sites mostly along surface water bodies that suggest most may need new CWIS. Overall, this anecdotal evidence indicates that EPA use of 44-59% of coal projects being affected will significantly underestimate the affected coal unit population.

*Biomass combustion and geothermal projects also require cooling water systems as part of their designs and may also be impacted by the rule. These projects were not discussed in the EPA NODA at all. These renewable projects tend to be a much smaller (<50MW) than the planned natural gas combined cycle and coal-fired power projects. Unfortunately, because of their small size, they are also much more difficult to track. In its current database, EVA has only 35 known biomass and geothermal projects under development that it considers highly likely and/or promising. Past history suggests that this sample represents only a small fraction of the ongoing activity. By 2020, EVA projects that:

-1,989 MW of MW new wood/wood-waste capacity projects (estimate >80 projects)

-6,954 MW of new municipal solid waste combustion and landfill gas combustion projects will come online.

-Geothermal capacity (net of retirements) will expand by 257 MW.

EPA Response

EPA evaluated the statement that 26 coal-fired power plants coal-fired power plants currently are

planned for development. The commenter acknowledges that of these, eight are being sited at existing powerplants. This leaves 18 new greenfield or stand-alone plants. EPA believes that this estimate supports EPA's analysis for the final rule, which projects that between 2005 and 2007, 25 new greenfield or stand-alone coal plants will begin operation (10 of them in scope of this rule).

The commenter further claims that all but two of the 26 new coal plants would require cooling water. EPA agrees that in the absence of a dry cooling system, new coal plants will require cooling water. However, EPA wishes to point out that the cooling water required by these new plants will not necessarily be subject to section 316(b) regulation. EPA's analysis shows that the majority of recently constructed coal plants do not withdraw cooling water from a water of the U.S. and would therefore not be subject to this rule. The commenter has provided no evidence, other than "anecdotal," as to the source of the cooling water for the 24 new coal plants.

The commenter also claims that biomass combustion and geothermal projects will also be affected by the rule. EPA disagrees with this statement. EPA reviewed data on 11 geothermal and 8 biomass (wood) facilities listed in the 1994 UDI database. These data indicate that all geothermal facilities but one use cooling water from sources not regulated by the section 316(b) rule (i.e., wells, steam condensate, municipal). One geothermal facility withdraws water from an irrigation canal, which may be considered a water of the U.S, thus EPA conservatively assumed that it was a water of the U.S. All 11 facilities operate a cooling tower and would therefore only incur minimal costs under this regulation. Four of the eight biomass facilities listed in the database use cooling water withdrawn from a water of the U.S. The generating capacity of these facilities ranges between 25 and 72.5 MW. New facilities with similar characteristics would be subject to the final rule, if their design intake flow exceeded two MGD.

If there were new geothermal or biomass facilities subject to the section 316(b) New Facility Rule, which EPA believes is unlikely, their costs would be similar to those analyzed for combined-cycle or coal facilities of an equivalent size, because the physical structure of a CWIS of geothermal and biomass plants is similar to that of a coal and combined cycle plants. Therefore, the cost analysis for coal and combined cycle is applicable to geothermal and biomass plants as well.

Comment ID 316bNFR.525.203

Subject Matter Code	21.2
Electric Generation Sector	

Author Name C. Richard Bozek

Organization Edison Electric Institute (EEI)

Future Generation Projects Not Yet Announced

The data presented above concentrates on only announced generation projects. These projects account for only a small percentage of the total US generation capacity needs by 2020.<fn8> The additional fossil-fuel and biomass combustion generating capacity from yet unplanned sources varies among power forecasters based upon differing outlooks for US economic growth, electricity intensity from technological changes, unit retirements, retail power prices and reserve margin assumptions. The distribution between future generating technology options also varies between forecasts based upon different outlooks for fuel prices and technology improvements.

EVA. Long Term Outlook (August 2000) had estimated that US power needs would need to grow by more than 300 GW by 2020. Since roughly 110 GW of high cost capacity would be retired by 2020, EVA projected that over 400 GW would need to be built between 2001-2020. Over 80 percent of these new capacity needs would need to come from coal or gas combined cycle facilities. <fn9> As outlined above, the vast majority of this type of new capacity would become subject to the EPA §316(b) rules.

Footnotes

8 For example, EIA's Annual Energy Outlook 2001 reports that over 96 percent of U.S. new generating capacity by 2020 will be from yet unplanned additions.

9 These projections are higher than EIA estimate of only 60% (250 GW) of new capacity needs (413 GW) being from coal or natural gas combined cycle facilities.

EPA Response

EPA disagrees with the commenter on both claims. First, EPA believes the AEO2001 is the most reliable energy forecast. Please see response to comment 316bNFR.525.021. Second, EPA disagrees that the "vast majority" of coal and combined-cycle facilities will be impacted by the final rule. EPA's projection of the number of new in-scope electric generators, which was based on the most current and complete data available at the time, showed that only 28.6 percent of new combined-cycle plants and 40.5 percent of new coal plants would be subject to the final rule. Of these, a large percentage of the new combined cycle facilities (93%) and coal facilities (71%) would meet the requirements related to the dynamic capacity (these are the most costly requirements) independent of this rule. Please see Chapter 5 of the Economic Analysis document for a complete documentation of EPA's projection of in-scope generators.

Overall, EPA maintains that the they used the most comprehensive data available. It is also important to note that the AEO 2001 forecast is broken out by fuel type, including both fossil fuels and renewable. For a discussion on new biomass capacity, see response to comment 316bNFR.525.202.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Phil Pierce

On Behalf Of:

Santee Cooper

Author ID Number:

316bNFR.526

Comment ID 316bNFR.526.001

Subject Matter Code	OPP
	General Statement of Opposition

Author Name Phil Pierce

Organization Santee Cooper

The South Carolina Public Service Authority (Santee Cooper) believes that any proposed and final rules developed to regulate industry should be based on scientific evidence of the potential impacts to the environment. Santee Cooper finds it interesting that "EPRI and some of the best fishery scientists in the world have never identified a site where definitive or conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures." <fn1> We encourage the EPA to duly evaluate the comments and studies submitted by the Utility Water Act Group (UWAG) and the Electric Power Research Institute (EPRI) and develop rules that are premised on scientific principles.

First and foremost, Santee Cooper has concerns with EPA's proposed approach for regulating new facilities under section 316(b) of the Clean Water Act. EPA's approach is too rigid and more akin to a "command-and-control" scheme that would require all new facilities, regardless of the deployed technology, to perform a variety of studies, including at least one year's worth of biological studies. Study findings would be used to assess whether more stringent requirements should be imposed even if the new facility is installing wet cooling towers or other advanced control technology achieving very low velocity intake rates. These requirements for studies assessing impacts are disturbing given that EPA's proposal fails to provide a clear standard for assessing when such more stringent requirements might be warranted or what they might entail. The lengthy and inefficient regulatory scheme contemplated by the EPA proposal also is of particular concern to energy producers who are under intense pressure to develop new generation facilities to meet growing regional and national energy demands.

Footnotes

1 The quotation is from page 28860 of the May 25, 2001, issue of the Federal Register. The Federal Register indicates the quote is from the comments and studies submitted by the Utility Water Act Group (UWAG) and the Electric Power Research Institute (EPRI) in response to EPA's request for comments to the August 10, 2000, proposed standards for cooling water intake structures at new facilities.

EPA Response

Although sources cited by the commenter "have never identified a site where definitive or conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures.", EPA has identified a number sites where such impacts have resulted from the operation of CWISs. These impacts are discussed in detail in section III of the preamble to the final rule and in Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities. As regards the rigidity of EPA's approach, see response to comment no. 316bNFR.069.002. The final rule has modified the study requirements under Track I in order to facilitate permitting at these facilities.

Comment ID 316bNFR.526.002

Subject Matter Code	10.16
	Two Track Process

Author Name Phil Pierce

Organization Santee Cooper

In lieu of the expensive baseline biological characterization and impingement/entrainment studies proposed by the EPA, Santee Cooper supports the two UWAG alternative approaches allowing industries more flexibility in the form of expedited permitting. Rules allowing industries seeking to build a new facility to commit to one or more of a number of specified technologies deemed to represent highly protective technology at the outset is an effective approach for implementing the goals of the statute. This approach would allow expedited permitting and no monitoring requirements for facilities that install wet cooling towers and low velocity intake structures, or systems of similar level of protection. The underlying rationale of the approach is that these systems would essentially eliminate adverse aquatic impacts and thus eliminate the need to perform extensive pre-construction monitoring and studies.

Alternatively, the UWAG approach would allow developers to conduct a site-specific study to determine the best technology available for minimizing adverse environmental impact for the site. This alternative makes sense for those worthwhile projects where the most advanced technology may not be technically or economically feasible or environmentally warranted. In such cases, the site-specific approach would come into play and should be based on the series of tests (as noted by UWAG) which identified less extensive studies that could be used to demonstrate no appreciable risk of adverse environmental impacts and determine the best technology available for the site.

As supported by the EPA's data on existing facilities noted in the paragraph below, we believe either of these approaches will provide an equivalent level of environmental protection without the more expensive and time-consuming baseline and subsequent studies the EPA originally proposed. In addition, the proposed two-track approach makes sense because it:

*is environmentally protective;
*preserves site-specific decision making, allowing more tailored and cost-effective solutions;
*establishes a more consistent process for site-specific decision making, so that similar cases will be treated similarly;
*allows new facilities the option of using highly protective technologies in order to speed the decision making process, but allows permit writers to make final decisions about whether those protective measures are appropriate and sufficient;
*uses incentives rather than "command and control" requirements to achieve the objectives of the statute; and
*avoids delaying the new facility permitting process (and the concomitant impacts on energy supply) except where justified by important site-specific circumstances.

EPA Response

Today's two track, technology based approach will allow for an expeditious and certain permitting process (Track I) as well as a site-specific, cost-effective, innovative option in those cases where the

permittee believes other technologies could achieve a comparable level of protection as in Track I (Track II). See preamble section V for further discussions on the basis of today's rule and section VII on implementation issues. EPA notes, however, that although it is not requiring pre-operational monitoring in today's rule, EPA will still require verification monitoring to take place after the facility is in operation. This requirement will ensure that both the permitting authority and the facility can follow the performance of the technology installed and assure its attainment of the goals of today's rule. See preamble section VII for discussions on the verification monitoring requirements of today's rule.

Comment ID 316bNFR.526.003

Subject Matter Code 10.16

Two Track Process

Author Name Phil Pierce

Organization Santee Cooper

The proposed EPA modifications to the UWAG alternative proposals, as discussed beginning on page 28870, essentially impose the same limiting thresholds EPA previously proposed for the various waterbody types and would render the UWAG proposals a disincentive. Based on the EPA's "estimates that almost all new facilities are likely to meet the proposed proportional flow standard for freshwater rivers and for estuaries and tidal rivers," <fn2> it would appear existing permitting procedures in the various states are effective in protecting the aquatic environment and obviate the need for the additional proposed EPA modifications. Similarly, it would appear the American Society of Engineers' Design of Water Intake Structures for Fish Protection manual, as noted on page 28865, is adequate. In view of these factors and considering the possibility that EPRI and some of the best fishery scientists in the world have never identified a site where definitive or conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures, what is the justification to modify the UWAG proposal? Santee Cooper urges the EPA to let the UWAG proposals stand without modifications.

Footnotes

2 This quotation is from the middle column of page 28870 and notes the conclusion is based on data for existing facilities.

EPA Response

See preamble section V.D for discussions why EPA is not accepting the industry two-track approach in full in today's rule.

Comment ID 316bNFR.526.004

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name Phil Pierce

Organization Santee Cooper

At page 28872, the EPA requests comments on how much the delays and uncertainties cost new facilities. The cash flow for Santee Cooper's recent purchase of two new simple cycle turbines may be used to relate to the potential costs of financing associated with permitting delays and uncertainty.

In today's deregulated electrical utility industry, it is not uncommon for the utility company to have to pay approximately 10 percent of the cost of the new generating unit(s) up front to guarantee themselves a customer position in the manufacturing order for the type of generating facility being planned. The utility company's projected commercial operation date must factor in the manufacturer's production backlog which in turn determines the up-front payment demanded by the manufacturer. During April 2000, Santee Cooper paid $7 million to guarantee a customer position for two 168 MW simple cycle combustion turbine peaking units. Additional payments associated with actual equipment manufacturing began eleven months later. The related finance costs to Santee Cooper for this order were approximately $500,000 for the eleven month period, or approximately $45,000 per month.

Similarly, should permitting delays extend the construction period, the associated costs would accumulate at the monthly rate indicated above. Should the commercial operation date shift, the lost income from sales of electricity that would otherwise have been available due to an earlier commercial operation date would also accumulate and be counted as a cost of doing business. With the deregulation of the wholesale market, the cost of purchasing replacement power on the open market could exceed many times the cost of generating power by the new generating unit.

EPA Response

EPA appreciates the examples and data provided by the commenter regarding potential economic implications of construction delays. The Agency anticipates that the final rule, which incorporates a two-track compliance option for the regulated entity, will not impose significant delays. Because the vast majority of entities within the scope of the rule will be able to comply with the "fast-track" option of the rule without altering their plant designs in any way, the regulatory impact will be minimal. Additionally, the Agency has determined that the economic implications for facilities needed to upgrade reduce their cooling water intake to levels achieved with recirculating closed-cycle cooling are such that the facilities will in all cases experience economically practicable costs. As such, the Agency anticipates no instances where facilities will experience delays related to avoiding the economic implications of meeting the technology based performance requirements of the rule. In the cases where a minority of the regulated facilities are anticipated to incur costs equivalent to upgrading from once-through to recirculating wet cooling the Agency cannot determine for certain whether or not the facilities will comply with the "demonstration track" of the rule in favor of the fast track. The Agency can say that given the option, some facilities, if faced with the possibility of losing their spot in a purchasing queue, as described by the commenter, may, in fact, chose the fast track. Despite the fact that the Agency cannot say for certain which facilities will choose the demonstration track, EPA conservatively estimates that the facilities will still incur the costs of the demonstration study when

they incur the costs of the flow reduction requirements. Because the Agency has explicitly included the option for demonstrations to be made using available data and information, instead of mandating up-front sampling in all cases, the flexibility of the rule is further enhanced.

The Agency anticipates that facilities will comply with the rule by incurring the least costs. For the case of the demonstration case, if turbine ordering burdens are a significant decision for the facility, then the facilities may, in fact, decide to forego the demonstration option and instead comply with the fast track. In this case, the Agency may have conservatively estimated the costs of compliance with the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

John Torgan

On Behalf Of:

Narragansett BayKeeper

Author ID Number:

316bNFR.527

Note

No comments were submitted. The author fully supports the comments made by Riverkeeper (316bNFR.529). Supporting documents to this letter may be found in the docket.

Comment ID 316bNFR.527.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name John Torgan

Organization Narragansett BayKeeper

No comments were submitted. The author supports 316bNFR.529. Supporting documents to this letter may be found in the docket.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Thomas A. Campbell

On Behalf Of:

Campbell, George & Strong o-b-o
Gunderboom, Inc.

Author ID Number:

316bNFR.528

Comment ID 316bNFR.528.001

Subject Matter Code	17.2
Passive Intake Systems	

Author Name Thomas A. Campbell

Organization Campbell, George & Strong o-b-o Gunderboom, Inc.

We have reviewed the record related to EPA's proposed standards for cooling water intake structures at new facilities to implement section 316(b) of the Clean Water Act (CWA) and, in particular, the Federal Register "Notice of Data Availability; National Pollutant Discharge Elimination System – Regulations Addressing Cooling Water Intake Structures for New Facilities" dated May 25, 2001. Numerous references to Gunderboom and/or Gunderboom technology are in the current EPA comment record such as certain UWAG comments regarding consideration of Gunderboom's technology as best technology available. These comments along with other references to Gunderboom, however, are incomplete and/or require clarification regarding the Gunderboom technology and its capabilities.

Gunderboom's experiences to date demonstrate that its technology can be used to meet or exceed performance-based criteria of minimizing impingement of fish or other large aquatic organisms and entrainment of fish eggs and larvae and other small organisms. Further, the technology utilizes intake velocities a full order of magnitude below the 0.5 fps approach velocity addressed in the proposed rule.

Since 1986, Gunderboom has demonstrated numerous successes of Gunderboom technologies on projects preventing the passage of particulates within a water body by using a continuously-improving, filter barrier curtain technology. Over the last six years, Gunderboom has developed and successfully applied this same technology to prevent the passage of fish eggs, larvae and other small or large organisms in water drawn in for once-through cooling, preventing impingement and entrainment. Based on these successful applications, the Gunderboom technology can be used, by itself, to achieve the level of environmental effectiveness equivalent to the use of wet cooling towers or dry cooling towers as well. In conjunction with other technologies, such as in combination with wet cooling towers, we suggest that the MLES™ can exceed the reduction in impingement and entrainment impact that would be accomplished by a flow reduction associated with use of dry cooling.

EPA Response

EPA appreciates the submittal of this information by the commenter and does not disagree with any of the assertions. EPA believes the Gunderboom (e.g., an aquatic filter barrier system) has great promise as a tool for reducing impingement mortality and entrainment at cooling water intake structures and for reducing the design intake velocity to less than 0.5 ft/s. For example, in full-scale testing at the Lovett Station, an existing power plant on the Hudson River in New York State, a gunderboom has provided 80%-plus reduction in the entrainment of eggs and larvae for extended periods during 1999 and 2000. However, as discussed in the September 12, 2001, memorandum in the record for today's rule, "Response to Questions Regarding the Ability of Other Technologies to Achieve Comparable Efficacy to Wet Closed Cycle Systems," technologies such as aquatic filter barrier systems need more widespread application to demonstrate their usability under a wide range of facility and environmental conditions. Thus, EPA believes the efficacy of these technologies should be

evaluated on a case-by-case basis as is possible under Track II of today's rule.

Comment ID 316bNFR.528.002

Subject Matter Code	17.2
	Passive Intake Systems

Author Name Thomas A. Campbell

Organization Campbell, George & Strong o-b-o Gunderboom, Inc.

The Gunderboom MLES™ fit under EPA's definition of a "passive screen technology" in that the system is essentially a large, fine-meshed screen through which all water must pass before entering into the cooling water intake system. However, it is uniquely different from all other passive screen technologies. Specifically, it is substantially larger, by well over an order of magnitude, than fine screens incorporated into traveling screen systems as well as so-called, wedgewire screening systems. This means that the velocity through the MLES™ filtering material is well over an order of magnitude less than the aforementioned traveling screen and wedgewire screening systems.

Based on our experience, depending on the specific design of the MLES™, the through-screen velocity will range from less than 0.01 feet per second (fps) to approximately 0.05 fps. For the other systems mentioned, this velocity is generally on the order of 0.5 fps. This significant advantage of the MLES™ means virtually all larger organisms can easily swim away from the screen during operation and nearly all small, motile organisms, including small fish larvae, can also easily swim away from the barrier. Additionally, should fish eggs or larvae be drawn up against the fabric, they will be subject to very little pressure from water being drawn through the fabric. Further, Gunderboom systems utilize an automated "Air-burst" system to periodically (e.g., every hour, half-hour, 2 hours, etc., depending on the needs of a particular site) shake the material and pass air bubbles through the curtain system to clean it of sediment buildup and re-release any other materials back into the water column.

EPA Response

EPA appreciates the submittal of this information by the commenter and does not disagree with any of the assertions. EPA believes the Gunderboom (e.g., an aquatic filter barrier system) has great promise as a tool for reducing impingement mortality and entrainment at cooling water intake structures and for reducing the design intake velocity to less than 0.5 ft/s. For example, in full-scale testing at the Lovett Station, an existing power plant on the Hudson River in New York State, a gunderboom has provided 80%-plus reduction in the entrainment of eggs and larvae for extended periods during 1999 and 2000. However, as discussed in the September 12, 2001, memorandum in the record for today's rule, "Response to Questions Regarding the Ability of Other Technologies to Achieve Comparable Efficacy to Wet Closed Cycle Systems," technologies such as aquatic filter barrier systems need more widespread application to demonstrate their usability under a wide range of facility and environmental conditions. Thus, EPA believes the efficacy of these technologies should be evaluated on a case-by-case basis as is possible under Track II of today's rule.

Comment ID 316bNFR.528.003

Subject Matter Code	17.2
Passive Intake Systems	

Author Name Thomas A. Campbell

Organization Campbell, George & Strong o-b-o Gunderboom, Inc.

A Gunderboom MLES™ is a barrier filter through which all water must pass to enter into a CWS. Its unwoven mesh fiber construction is such that the "apparent opening size" of its mesh is approximately 20 microns. For MLES™ applications, Gunderboom adds perforations to increase the ability of the fabric to flow water. These perforations may be of various range of diameters, from approximately 0.4 or 0.5 mm on up to 3.0 mm or more. Ultimately, size is dependent on what perforation size is required to prevent the entrainment of the specific eggs or fish larvae that are present in the water at a specific location and in a specific water body.

The MLES™, as with all Gunderboom barrier filter curtain systems, is a physical barrier that allows water to pass but prevents particles, or particulates from passing. If an MLES filter curtain is in place, fish eggs or larvae cannot pass through it. This has been attested to by data collected during the development of the MLES™ at the Lovett Generating Station (see attached Lovett Gunderboom Annual Reports for 1995, 1996, and 2000) and by laboratory observations (see attached LMS, 2001 and E. Radle, NYSDEC, email of 6/22/01). The Gunderboom MLES™ fabric perforation diameter is selected and customized to provide for exclusion of the smallest targeted planktonic organism, usually fish eggs. (Larger perforation sizes allow for increased flow, reducing required fabric area and reducing the cost of the system, so perforation diameter is one of the factors considered on a case-by-case basis for design.)

An additional issue that has been raised and considered is the potential for egg of larval mortality associated with contact with the boom. There are factors that logically minimize this as a potential impact. First, is the very low through-fabric velocity (on the order of 0.02 fps, or, possibly 0.01 to 0.05 fps) because the CWS flow is spread over the relatively large area of the filter curtain. Second, this low velocity means that any water currents in the water body will have a natural tendency to carry planktonic organisms away rather than have them linger at the surface of the fabric. Third, the Air-burst™ cleaning cycle can be set to any frequency and any eggs that might contact the surface would be released back into the water within the time interval of the air bursts. Fish larvae of virtually any size can easily escape from the low velocities into the boom (See attached E. Radle, NYSDEC, "white paper"). Fish eggs would be expected to survive unharmed (see LMS report on laboratory boom impingement study results, 2000; and, E. Radle email summary of boom contact survival of American shad eggs, 6/22/01).

Gunderboom's filter barrier systems, of which the MLES™ is one application, have been successfully deployed in numerous types of water bodies including freshwater rivers and streams, lakes, tidal rivers and oceans. Fish eggs and larvae are excluded from the intake water by virtue of the low fabric pore size (20 microns) and the perforation diameters (0.4 to 3.0 mm, generally). Further, the system ultimately deployed can be modified to ensure consideration is given to specific location requirements. Gunderboom installation sites and successes are addressed in the following paragraphs.

Gunderboom systems have been successfully deployed across the United States including in cold and

warm climates and through winters and summers. They were in water bodies from lakes to streams, rivers, estuaries and coastal marine environments. A number have been in the water for many years, even without being removed for maintenance. Two RPS™ booms (one 350 feet, the other 650 feet long) have each been in the water in the northeastern US for 2 ½ and 3 years, continuously filtering. Both are in water bodies that freeze in the winter. Another system (2, 300-foot booms) was continuously in a settling pond in northern Alaska for seven years. A BPS™ in an estuarine environment was deployed in successive years and was not redeployed due to its exposure to an oil spill. The Lovett MLES™ for 1999 was redeployed in 2000 and observations by E. Radle of NYSDEC and others verify that the filtration fabric remains in excellent condition with no significant biofouling.

Gunderboom systems have withstood water level fluctuations in excess of 12 feet per day, waves of at least 5-6 feet, and been present in currents of 3-4 knots. None have experienced significant biofouling to date. No barnacles, mussels, hydroids, tunicates, bryozoans, or significant macroalage growth has been observed growing on the filter fabric for any systems. Minor macroalgae growth occurred in one year on one end of the Lovett system (see Lovett 2000 report), but this was minor and did not interfere with the effectiveness of the system. (It occurred in an unusual low flow year and was in an area receiving some thermal enrichment for a thermal discharge from the plant).

During recent years, several new Gunderboom system applications have further demonstrated the efficacy of Gunderboom systems to control the migration of particulates in water and added additional depth and breadth to the proven design capabilities for the MLES™ and other Gunderboom systems. Gunderboom designed and deployed a 350-foot system for a US EPA barrier curtain demonstration project (see Draft Final Demonstration project report, Gunderboom, 2001). This system incorporated relatively recent developments for the hood material, Air-burst™ system, and other connection point design improvements. After completion of the testing, the Massachusetts Metropolitan District Commission has requested the opportunity to acquire the boom for continuous use as a component of their surface water quality management program. Gunderboom provided a system to be evaluated for its efficacy in controlling contaminants from dredging of creosote-contaminated sediments in Olympia, WA (see Cascade Pole Site Pilot Scale Test Report, 1999). This system was determined to be successful and a full-scale Gunderboom CPCS™ is being fabricated for the project. For another recent project (see CalTrans Gunderboom Pilot System Test Report, 2000), Gunderboom engineers designed and fabricated a frame-supported system, with two fabric layers and Air-burst™ system, similar to an MLES™, to serve as an underwater sound attenuation system (see Gunderboom CalTrans Report, 2000). The system was successfully deployed in a test for protection of fish and marine life from a pilot evaluation of the use of 7-foot diameter piles.

Gunderboom systems are engineered for the specific site and application and may be developed in conjunction with other aquatic, coastal or marine structures or facilities. Recent designs have incorporated existing plant intakes, floating walkways in lieu of internal boom floatation, pile-supported structures, concrete, submerged structures, removable panels, solid cell support structures. For example, one facility design utilized a fully-submerged concrete fusiform intake structure with fixed panels of Gunderboom MLES™ filter fabric. This facility was approximately 500 feet offshore in major navigable, tidal river. Another facility under design will incorporate a fixed structure, just outboard of a present shoreline bulkhead intake structure, to accept Gunderboom MLES™ panels. This facility will be subject to strong currents, semi-diurnal tides, and large debris and possibly ice

exposure. A third design, for a facility in a noted high current area within New York Harbor, will incorporate Gunderboom MLES™ into cartridges within an existing intake bay. The design of the cartridges will provide a means of yielding a surface area that would otherwise not be able to be reached within the space of the intake bay. For new or re-powered facilities, Gunderboom engineers work closely with facility designers, planners and engineers to develop the optimum system design for the application. For new plants or facilities that will incorporate some minimization of cooling water flow (e.g., wet cooling towers), Gunderboom's MLES™ can be used for most CWS's drawing water from surface waters.

EPA Response

EPA appreciates the submittal of this information by the commenter and does not disagree with any of the assertions. EPA believes the Gunderboom (e.g., an aquatic filter barrier system) has great promise as a tool for reducing impingement mortality and entrainment at cooling water intake structures and for reducing the design intake velocity to less than 0.5 ft/s. For example, in full-scale testing at the Lovett Station, an existing power plant on the Hudson River in New York State, a gunderboom has provided 80%-plus reduction in the entrainment of eggs and larvae for extended periods during 1999 and 2000. However, as discussed in the September 12, 2001, memorandum in the record for today's rule, "Response to Questions Regarding the Ability of Other Technologies to Achieve Comparable Efficacy to Wet Closed Cycle Systems," technologies such as aquatic filter barrier systems need more widespread application to demonstrate their usability under a wide range of facility and environmental conditions. Thus, EPA believes the efficacy of these technologies should be evaluated on a case-by-case basis as is possible under Track II of today's rule.

Comment ID 316bNFR.528.004

Subject Matter Code	17.2
	Passive Intake Systems

Author Name Thomas A. Campbell

Organization Campbell, George & Strong o-b-o Gunderboom, Inc.

Gunderboom's experience with the MLES™ as well as other Gunderboom system projects has provided us with a basis for rough-estimating costs for a "typical" Gunderboom installation for the categories of "small", "mid" and "large" used by US EPA in its analysis for existing power plants and representing the 25th, 50th and 75th percentile, respectively. We estimate costs on the order of $1,500,000 to $2,100,000 for the mid and $5,200,000 to $6,900,000 for the 500 MGD system. Operations and maintenance costs are highly dependent on the location, including environmental factors, but might be expected to be on the order of $100,000 to $300,000 for small systems, $150,000 to 300,000 for a 150 MGD system and $500,000 to $700,000 for a 500 MGD system.

[see original document for table]

Operations and maintenance costs are highly dependent on the location, including environmental factors, but might be expected to be on the order of $100,000 to $300,000 for small systems, $150,000 to 300,000 for a 150 MGD system and $500,000 to $700,000 for a 500 MGD system.

Several additional considerations are germane for the Gunderboom MLES™ costs relative to other alternatives under consideration:

1. The MLES™ prevents entrainment and impingement. It also prevents the passage of debris and excludes many particles from entering the cooling water system. Thus, O&M costs associated with the traveling screens are reduced by the proportion of time the Gunderboom is deployed. Also, the Gunderboom removes substantial amounts of sediment particles that may cause wear on the condenser tubes and other parts of the CWS.
2. The MLES™, if maintained effectively in place, should be able to achieve environmental performance of, not only wet cooling towers, but even of dry cooling systems.
3. Installation of an MLES™ can occur with no or with a minimal plant shutdown during installation and maintenance.

EPA Response

EPA appreciates the submittal of this information by the commenter and does not disagree with any of the assertions. EPA believes the Gunderboom (e.g., an aquatic filter barrier system) has great promise as a tool for reducing impingement mortality and entrainment at cooling water intake structures and for reducing the design intake velocity to less than 0.5 ft/s. For example, in full-scale testing at the Lovett Station, an existing power plant on the Hudson River in New York State, a gunderboom has provided 80%-plus reduction in the entrainment of eggs and larvae for extended periods during 1999 and 2000. However, as discussed in the September 12, 2001, memorandum in the record for today's rule, "Response to Questions Regarding the Ability of Other Technologies to Achieve Comparable Efficacy to Wet Closed Cycle Systems," technologies such as aquatic filter

barrier systems need more widespread application to demonstrate their usability under a wide range of facility and environmental conditions. Thus, EPA believes the efficacy of these technologies should be evaluated on a case-by-case basis as is possible under Track II of today's rule.

Comment ID 316bNFR.528.005

Subject Matter Code	17.2
	Passive Intake Systems

Author Name Thomas A. Campbell

Organization Campbell, George & Strong o-b-o Gunderboom, Inc.

Gunderboom's technology meets or exceeds EPA's objective of minimizing the adverse environmental impact from water intake structures at new facilities provided for in the CWA 316(b) proposed regulations. The goal of minimizing adverse environmental impacts ultimately and directly relates to the elimination or reduction of entrainment and/or impingement of relevant marine resources. Gunderboom has developed and proven a technology that is capable of dramatically reducing, and is some circumstances eliminating, impingement and entrainment in a variety of water body types. Therefore, on behalf of Gunderboom, we respectfully submit that Gunderboom be considered a best technology available in the context of the subject proposed regulations. In the alternative, the Gunderboom technology, in and of itself, should be included as a viable, cost-effective technology that meets or exceeds EPA's performance criteria. Or, we request that Gunderboom be included among the suite of technologies capable of meeting or exceeding EPA's minimum performance requirements for minimizing adverse environmental impact as contemplated in the proposed regulations. Designation of Gunderboom as BTA under this alternative could be done after a site-specific study, as described in various comments contained within the May 25, 2001 Federal Register Notice.

EPA Response

EPA believes the Gunderboom (e.g., an aquatic filter barrier system) has great promise as a tool for reducing impingement mortality and entrainment at cooling water intake structures and for reducing the design intake velocity to less than 0.5 ft/s. For example, in full-scale testing at the Lovett Station, an existing power plant on the Hudson River in New York State, a gunderboom has provided 80%-plus reduction in the entrainment of eggs and larvae for extended periods during 1999 and 2000. However, as discussed in the September 12, 2001, memorandum in the record for today's rule, "Response to Questions Regarding the Ability of Other Technologies to Achieve Comparable Efficacy to Wet Closed Cycle Systems," technologies such as aquatic filter barrier systems need more widespread application to demonstrate their usability under a wide range of facility and environmental conditions. Thus, EPA believes the efficacy of these technologies should be evaluated on a case-by-case basis as is possible under Track II of today's rule.

EPA has evaluated all technologies that are available to minimize adverse impact. In developing the regulatory framework that is presented in the final rule, EPA is both requiring that facilities reduce impingement and entrainment to an equivalent level as that which can be achieved by a closed-cycle, recirculating cooling water system as well as requiring facilities to further reduce impact by limiting through-screen velocity, and requiring design and construction technologies. In addition, further controls are required to prevent facilities from taking a large proportion of the waterbody flow. EPA believes the combination of these requirements is best technology available. However, EPA is not dictating the specific technologies with which a facility must meet these requirements. EPA believes that better controls can be implemented to minimize impingement and entrainment by letting the facility evaluate site specific conditions when choosing appropriate technologies.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

David K. Gordon & Reed W. Super

On Behalf Of:

Riverkeeper

Author ID Number:

316bNFR.529

Note

Attachments received with 529 coded as 316bNFR.529, beginning with comment number 100 ("Comments…"), 200 ("The use…"), 300 ("Are coastal…"), 400 ("Re: comments…") and 500 ("Cost Implications…")

Comment ID 316bNFR.529.001

Subject Matter Code 2.2

Obligation Under 316(b)

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Best technology available (BTA) is a technology-based standard which must be implemented in the same manner as BAT, BCT, BPT and NSPS: the limitations must be uniform, technology-based, and technology forcing. Clean Water Act sections 301, 304, 306 and 316(b) all require EPA to establish regulatory limitations based on uniform technology, which minimizes impacts in all local conditions. EPA has promulgated BAT, BPT, NSPS and other effluent limitations for the steam electric generating industry in 40 CFR Part 423 (47 FR 52290). Those limitations are stated in terms of performance standards for the discharge of pollutants, set with reference to particular pollution control technologies, and applicable to all U.S. facilities in the industry, regardless of location or any other site-specific factors. "In setting BAT, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible." (Kennecott v. EPA, 780 F.2d 445, 448 (4th Cir. 1985).) EPA must promulgate BTA limitations in the same way.

EPA Response

EPA agrees that it is reasonable to interpret section 316(b) to authorize a primarily technology-based approach to the final rule for new facilities. The commenter's comments speak exclusively to one part of a technology-based rule. EPA notes that other considerations, such as economic practicality and non water quality environmental impacts (including energy impacts) are also relevant to technology-based determinations under the CWA. These other factors are relevant to the option EPA selected and other options that EPA rejected in this rule.

Comment ID 316bNFR.529.002

Subject Matter Code	18.0
Best Technology Available-Cost Considerations	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper

EPA may not take costs into account, nor provide for variances, in setting BTA standards. BTA is worded similarly to BAT (Best Available Technology) and the New Source Performance Standard of BADCT (Best Available Demonstrated Control Technology). However, unlike BAT and BADCT, Congress required EPA to set BTA limitations without regard to compliance costs. Where a statutory provision requires EPA to set standards to protect human health or the environment, but does not explicitly specify that costs should be factor, EPA may not take costs into account. This is particularly true where other provisions of the same statute expressly require consideration of costs. (See Whitman v. American Trucking Associations, 531 U.S. 457 (2001).) EPA also lacks the statutory authority to provide for variances from BTA standards because Congress expressly allowed variances only from BAT limitations for existing sources, not from BTA limitations or BADCT for new sources. (Compare CWA § 301(c) and § 301(n) with § 306 and § 316(b); E.I. DuPont v. Train, 430 U.S. 112, 138 (1977).

EPA Response

EPA disagrees with the commenter's claim that the Agency is prohibited from taking costs into account in establishing BTA limitations." See also response to comment 316bNFR.206.014 in comment category 10.11. EPA also disagrees with the claim that EPA lacks the statutory authority to provide for variances from BTA standards. For a discussion regarding the policy behind the alternative requirements provisions please see response to comment 316bNFR.053.021.

Comment ID 316bNFR.529.003

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Subject Matter Code 2.2

Obligation Under 316(b)

Clean Water Act Section 316(b) has a very different function, purpose and standard than does Section 316(a). Clean Water Act Section 316(a) pertains to thermal pollution; Section 316(b) addresses cooling water intake structures (CWIS). The two are related only in that water-cooled facilities typically employ a CWIS and create thermal discharges. But unlike Section 316(b), Section 316(a) is not a provision requiring EPA to establish national effluent limitations or any other limitations. Since thermal energy is a necessary and constantly fluctuating component of all ecosystems, Section 316(a) sets forth a flexible standard allowing state permit writers to adjust the effluent limitations for heat to preserve ecological health. Because of this difference, and because the language of two sections is entirely dissimilar ("minimizing adverse environmental impact" vs. "protection and propagation of a balanced, indigenous population") there is no basis for reading the Section 316(a) standard into Section 316(b), as industry suggests.

EPA Response

EPA addressed this issue in the preamble to the final rule. See also responses to comments 316bNFR 068.007 and 316bNFR 068.008.

Comment ID 316bNFR.529.004

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Subject Matter Code 2.2

Obligation Under 316(b)

Congress enacted Section 316(b) in response to fish kills. In the years immediately preceding the enactment of 1972 Clean Water Act amendments, a number of well publicized massive fish kills occurred at the cooling water intake structures of U.S. power plants. For example, in 1969 and 1970, the P.H. Robinson plant in Galveston Bay, Texas impinged more than 7 million fish in 12 months and the Indian Point No. 1 nuclear plant on New York's Hudson River killed 1.3 million fish over a 10 week period. In the late summer of 1971, more than 2 million dead menhaden clogged the screens at the Millstone plant in Niantic Bay, Connecticut. (See enclosed excerpts from New York Times articles and Clark and Brownell, Electric Power Plants in the Coastal Zone: Environmental Issues (1973), p. V-8, tbl. V-B.) Congress was clearly concerned about the number of fish being killed by the intakes of power plants with once-through cooling systems, and enacted Section 316(b) to address – in fact, to minimize – that impact. Fish kills remain the overwhelming impact from cooling water intake structures. Industry and other parties have suggested that the minimization standard of Section 316(b) applies to a diversity of potential impacts, including air emissions, visual and land use impacts and energy supply. However, from its enactment in 1972 and currently, aquatic mortality is the overwhelming impact.

EPA Response

EPA believes that impingement and entrainment are among the adverse environmental impacts that EPA is authorized to address under section 316(b).See the preamble to the final rule.

Comment ID 316bNFR.529.005

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Cooling water intake structures, by their very presence and operation, cause adverse environment impact. Although the impact can never be completely eliminated, any interference in the natural system by killing organisms or otherwise adversely affecting them or their habitat must be minimized. Section 316(b) must be interpreted with a focus on minimization of impact. The phrase "minimize adverse environmental impact" defines the goal of the BTA technology, just as "greatest degree of effluent reduction" defines the goal of BADCT technology in Section 306(a)(1). Neither phrase was meant to provide a threshold for application of the relevant limitation. Permitting authorities can and must regulate technologies to minimize adverse impacts, without engaging in unnecessary and distracting speculation as to how adverse they impacts to be to render them objectionable. The only regulatory thresholds in Section 316(b) are that the facility must be a point source (thereby subjecting it to the NPDES program) and employ a cooling water intake structure. Every man-made intrusion into the natural environment causes some impact. Certainly, the construction, installation and under-water operation of a large intake structure which withdraws large volumes of water from a natural waterbody causes adverse impact on the environment.

EPA Response

EPA agrees that impingement and entrainment can cause environmental impacts and has included these in the interpretation of AEI (see preamble section VI.B.2.a). Today's rule seeks to minimize AEI, including impingement and entrainment, through implementation of technology-based performance standards.

Comment ID 316bNFR.529.006

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Industry abuses compensation theories (and density-dependent models) to proffer the absurd contentions that millions of fish are not "ecologically relevant" and the killing of millions of fish is not adverse environmental impact. In order to justify the status quo and avoid installing better technology, industry has responded to the mandate of Section 316(b) by developing elaborate justifications for the massive kills they cause. The primary theoretical justifications are that only adult fish populations have ecological value; that the larvae, eggs and juvenile fish killed by power plants are "surplus production"; and that killing large numbers of young fish will have no impact on the adult population because those fish would have died of other causes anyway. There are a variety of problems with this counter-intuitive, self-serving approach, not the least of which is the lack of evidence and scientific support for the powerful density-dependent models (typically, Beverton-Holt and Ricker curves) suggested by industry. Perhaps the most devastating critique of this concept was that of J. Boreman (2000) in Environmental Science & Policy, 31, 445-449. In addition, Dr. P.A. Henderson of PISCES Consulting, Ltd., has authored a number of papers that take issue with the scientific underpinning of the density-dependent models utilized by the electric generating industry. Among those are Henderson, The use and abuse of density-dependent models for the assessment of the impact of power station cooling water intakes on fish populations, February 2001, prepared for the American Fisheries Society Conference in August 2001. That paper is attached to the PISCES Comments submitted herewith and shows that "density-dependent models have been inappropriately applied to conclude that the large numbers of fish killed will have no effect on the adult population size. Typically, proponents utilise such models without any proof that density-dependence is operating, and appropriate statistical tests of the fish populations under study fail to indicate such density-dependence." (p. 1) PISCES's critique of industry's over-reliance on density-dependent models can also be found in Technical Comments on the Draft Environmental Impact Statement for the State Pollutant Discharge Elimination System Permit Renewal for Bowline Point 1 & 2, Indian Point 2 & 3, and Roseton 1 & 2 Steam Generating Stations, June 2000, which has previously been submitted to EPA.

EPA Response

EPA agrees that there are potential weaknesses and inaccuracies associated with compensation and density-dependent models and has prepared a detailed discussion of these issues in section VI.B.2.c of the preamble.

Comment ID 316bNFR.529.007

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Subject Matter Code 10.0

Best Technology Available

Because it is the most destructive, least protective, antiquated technology, once-through cooling cannot be considered BTA. In 1972, Congress directed in Section 316(b) that EPA mandate technology to minimize fish kills at cooling intakes. Cooling system technology has improved such that once-though cooling is not required for electric power generation. Indeed, it is not even the conventional technology for new power plants. A far greater number of plants built in the last 20 years have recirculating cooling systems. That EPA would, nearly 30 years after the enactment of Section 316(b), allow new facilities to be constructed with once-through cooling systems is completely contrary to the intent of Congress and the objectives of the Clean Water Act.

EPA Response

The two-track approach imposes performance requirements based on reduction in flow commensurate with closed-cycle cooling. The focus of the requirements is on the performance of a technology, not the technology itself. See also responses to comments 316bNFR.206.009 and 316bNFR.206.017.

Comment ID 316bNFR.529.008

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

BTA is dry-cooling because it is an available, effective, affordable technology, which minimizes adverse impacts. Like BAT, BTA must be set with reference not to the average plant, but to the optimally operating plant. The Act is technology-forcing, and so long as the best technology is commercially available, EPA must mandate its use. While evaporative cooling towers may be the average new plant's technology in 2001, dry cooling is a fast growing cooling technology. Because, few new power plants were built here in the 1990s, the United States is somewhat behind the rest of the developed world in dry cooling installations. There are 600 dry-cooled plants worldwide, 60 in this the U.S., and many more proposed or being built. Nearly half (45%) of the new or expanded power plants currently proposed for New York State (10 of 22) are to be dry-cooled. <fn1> Many of these plants (and some wet-cooled proposals) will use municipal water sources, thereby eliminating impingement and entrainment. Therefore, there can be no doubt that dry cooling technology is readily commercially available. It is also effective, reliable and affordable. (See Comments on the EPA's Proposed Regulations on Cooling Water Intake Structures for New Facilities, prepared by William Dougherty, Ph.D., Stephen Bernow, Ph.D., and Tom Page, Tellus Institute, November 6, 2000.) Conversely, fish protection technologies such as the Gunderboom (which, when deployed with a wet cooling tower, is sometimes proffered as a dry-cooling equivalent) is an unproven experimental technology, which has never been included as a component of BTA in a NPDES permit.

Footnotes

1 The ten proposed dry-cooled plants are Athens Generating Plant and Wawayanda in or near the Hudson Valley; Ramapo Energy Project and Torne Valley Station in the Torne Valley; Brookhaven, Caithness Island Power Project and Spagnoli Road Energy Center on Long Island; and Astoria Energy, Poletti Station, and Ravenswood Cogeneration Project in Queens. (See NYS Board on Electric Generation Siting and the Environment website at www.dps.state.ny.us/articlex.htm for list of all 22 proposed new plants.)

EPA Response

While EPA acknowledges dry cooling is commercially available and is currently in use, EPA rejects dry cooling as BTA for the reasons discussed in Section V.C of the preamble to the final rule. See responses to comments #316bNFR.206.012, #316bNFR.206.013, and #316bNFR.206.014.

Even when considering costs for appropriate purposes (such as for the Unfunded Mandates Reform Act), the costs of closed-cycle cooling are negligible and the costs of dry-cooling are minor. Even though the Clean Water Act prohibits EPA from taking costs into account in establishing BTA limitations, other statutes and Executive Orders may require EPA to assess and report on what impact (including financial impact) its regulations have on states that implement them and on the regulated community. These administrative requirements were discussed in the Phase I proposal in conjunction with the Paperwork Reduction Act, Unfunded Mandates Reform Act, Regulatory Flexibility Act, and several Executive Orders. (65 FR 49105.) With regard to EPA's compliance with these administrative procedures, it is clear that the costs of minimizing adverse environmental impacts are minimal. As the enclosed Tellus comments demonstrate, the incremental cost per kilowatt hour is approximately 0.01 to 0.03 cents per kilowatt hour (kWh) for closed-cycle cooling, 0.14 to 0.19 cents per kWh for hybrid cooling, and 0.21 to 0.27 cents per kWh for dry cooling. If the price of energy to the consumer is estimated at 6 to 12 cents per kWh (for an average of 9 cents per kWh), then the incremental total costs of installing closed-cycle cooling or dry-cooling would raise energy prices by only .11% to .33% (closed-cycle) or 2.3% (dry cooling.) Those calculations can be seen in the following table:

Incremental Cooling System Costs

	Closed-Cycle	HybridCooling	Dry-cooling
Incremental Cost (cents / kWh) (low)	0.01	0.14	0.21
Incremental Cost (cents / kWh) (high)	0.03	0.19	0.27
Avg. Base Energy Cost (cents/ kWh))	9	9	9
Percent increase in energy costs (low)	0.11%	1.56%	2.33%
Percent increase in energy costs (high)	0.33%	2.11%	2.33%

These figures come from an economic case study prepared by the Tellus Institute, entitled Cost Implications of Upgrading the Cooling Systems at the Indian Point 2 and 3 Nuclear Power Plants, February 2001, and submitted herewith in draft form with a cover letter from its principal author, William Dougherty, Ph.D. Because the case study looks at a retrofit situation, cooling system costs for existing facilities will be even lower.

Industry inflates the costs of state-of-the-art protective technology and states them as total cost figures so as to magnify them. In fact, when compared to the revenues and profits of this industry, and assessed on a per kilowatt hour basis, they are very minor. As this economic data shows, an increase of one-tenth or three-tenths of a percent in energy costs for closed-cycle cooling is negligible. An increase of approximately 2% for dry cooling is also very minor, especially considering that base energy prices fluctuate rapidly. Such an increase would not be felt or even noticed by the

energy consumer if it were passed on, or by the generator if it were not.

EPA Response

EPA disagrees with the commenter's claim that "the Clean Water Act prohibits EPA from taking costs into account in establishing BTA limitations." Section 316(b) of the Clean Water Act contains no direct reference to costs but has been interpreted to require consideration of costs when establishing BTA requirements. See also response to comment 316bNFR.206.014 in comment category 10.11.

EPA also disagrees with the commenter's estimates of incremental costs and the percent increase in energy costs for the three cooling system types. As discussed in response to comment 316bNFR.529.501, EPA believes that the Tellus report cited by the commenter seriously misrepresents the costs for these cooling system types. As a result, EPA questions the commenter's conclusions about their effect on energy costs.

Comment ID 316bNFR.529.010

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Subject Matter Code 10.01

Regulatory Framework Options

The disparate BTA standards for estuaries, oceans, lakes, littoral zones, rivers and other waters rely on unworkable definitions and are contrary to the Clean Water Act. The Clean Water Act does not allow EPA to apply a less-protective technology to waterbodies deemed by EPA to be less productive or less sensitive. In addition, in our November 2000 comments on the Phase I proposal, we and our consultants took issue with several of the definitions EPA proposed to identify the nine different waterbody types and sections. As Dr. Henderson explains in his comments submitted herewith, EPA has somewhat improved on the littoral zone concept and the definition of estuary. However, the significant legal problem remains in that technology based-standards such as BTA must be nationally-uniform, and reducing capacity to the lowest possible volume will always minimize impacts, regardless of the source waterbody at issue.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. EPA is setting the same performance-based technology requirements for all waterbodies as for tidal rivers and estuaries (the most stringent requirements from the proposed rule). Also see response to comment 316bNFR.006.005.

Comment ID 316bNFR.529.011

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper

Defining BTA as dry-cooling would not adversely affect the supply, reliability or supply of energy, and would be consistent with the recent Executive Orders. Closed-cycle cooling reduces water usage and resulting fish kills by approximately 98% compared to once-through cooling. Dry cooling reduces it by a further 98%. The loss of one million fish on the intakes of a direct-cooled plant would be reduced to less than 20,000 dead fish if a cooling tower were present, and to less than 400 dead fish if the plant were dry-cooled. These are startling reductions and dry cooling is therefore mandated as BTA to minimize adverse environmental impact. Industry and the Department of Energy (DOE) argue that minor efficiency losses associated with closed cycle and dry-cooling (known as an "energy penalty") make these technologies undesirable or not BTA. This is a red herring. The energy penalty, where it exists, is on the order of 1-2%. Contrasting this with the 99.9% reduction in aquatic impacts leads to the inescapable conclusion that minimizing water quality impacts is not only mandated, but extremely beneficial for the environment. The energy penalty also must be viewed in the context of energy efficiency generally. First, switching from steam-only generation to combined-cycle or cogeneration increases efficiency by 10-20% or more. Thus, plants with state-of-the-art turbines and closed-cycle or dry cooling are more efficient than older plants with once-through cooling. Second, transmission losses also exceed the energy penalty associated with the choice of cooling system. By locating away from major bodies of water and closer to energy users, a move which dry cooling makes possible, the energy penalty can be more than compensated for. Third, a 1-2% loss for the sake of greater protection of water resources is comparable to other efficiency penalties required by EPA of the electric industry for reductions in NOx and SO2 emissions.

EPA Response

EPA disagrees that dry cooling offers an improvement of 98% over wet cooling systems. See response to comment #316bNFR206.012.

See response to comment #316bNFR.206.014 for discussions about siting power plants away from water bodies and transmission losses and energy penalties.

See response to comment #316bNFR.006.007 for discussion of combined cycle plants vs. steam only generation plants.

Comment ID 316bNFR.529.012

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

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At proposal, EPA included in the definition of "cooling water intake structure" a threshold that 25% of the water withdrawn by the structure be used for cooling. (See proposed 40 CFR 125.83; 65 FR 49116.) In the NODA, EPA indicates it is considering changing that threshold. (66 FR 28854.) Because the withdrawal of water by intake structures needlessly kills fish and other aquatic life, we urge EPA to maintain or lower the 25% threshold in order to maximize the volume of intake flows and facilities covered by the rule. The percentage of water used for cooling compared to other purposes has no bearing on the aquatic environment. All else being equal, a 10 MGD water withdrawal, 20% of which is used for cooling, will kill an equivalent number of fish as a 10 MGD withdrawal, 25% of which is used for cooling. There is no rational or statutory justification for exempting the former facility. Indeed all facilities that withdraw waters of the U.S. for cooling should be included, unless the cooling water constitutes a negligible proportion of the flow.

EPA has requested comment on two alternative consequences of this regulatory threshold: (1) facilities not meeting the threshold are exempt from Section 316(b); or (2) facilities not meeting the threshold would be permitted on a case-by-case basis by the permit writer. (66 FR 28854.) If the threshold is set anywhere above a de minimis level, then EPA must choose the second alternative because it has no statutory authority to exempt cooling water intake structures from the BTA requirement. As explained above, a facility which withdraws any non-negligible quantity of water from a water of the U.S. through an intake structure for cooling purposes must be subject to Section 316(b).

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by

new facilities that are below the threshold.

Permit writers may determine that an intake structure that withdraws less than 25 percent of intake flow for cooling purposes should be subject to section 316(b) requirements and set appropriate requirements on a case-by-case basis, using Best Professional Judgment (BPJ). Today's rule does not inhibit permit writers from addressing such cooling water intake structures as deemed necessary.

Comment ID 316bNFR.529.013

Subject Matter Code 7.4

Water Withdrawal threshold

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EPA is also considering changing the design intake capacity threshold from the proposed 2 MGD level (65 FR 49067-49068) and is considering as a model State of Maryland regulations which exclude flows less then 10 MGD if the volume withdrawn is less than 20 percent of the design stream flow (in nontidal waters) or available dilution waters (in tidal waters). (66 FR 28854.) EPA should maintain or lower the 2 MGD threshold so as to maximize the volume of intake flows and facilities covered by the rule. If the threshold were raised to 10 MGD or another significantly increased threshold, many facilities that use substantial quantities of waters of the U.S. and that needlessly slaughter fish would be exempted from the rule.

As an example, in New York State, the recently permitted Athens Generating Station proposed to use closed-cycle wet cooling (later amended to hybrid cooling), and to withdraw approximately 5 to 7 MGD from the Hudson River. The interveners in the state administrative hearing successfully demonstrated to the commissioner of the Department of Environmental Conservation that dry cooling (using 0.18 MGD) was BTA under Section 316(b) and the analog state provision. If the threshold were 10 MGD, facilities like the Athens plant would not have been subject to the Phase I rule, resulting in inferior technology requirements (i.e., not best technology available) and a failure to minimize adverse environmental impacts. While states may enact more stringent controls than the minimum federal standards, many will not do so. Indeed, national Clean Water Act regulations were intended to prevent a "race to the bottom." Moreover, if EPA were to choose the alternative in which facilities not meeting the threshold were completely exempt from Section 316(b), states might lose altogether their ability to regulate the intakes at such facilities.

Moreover, even ultra low capacity intakes should be subject to Section 316(b) because the design, location and construction of the structure must also reflect BTA for minimizing adverse environmental impact. For example, constructing and installing the intake may involve trenching through highly sensitive river bottom or substrate and damage benthic habitat. Section 316(b) requires best technology available to minimize such impact regardless of the capacity. Likewise, a poorly designed and located intake structure will kill a significant number of fish, even if the capacity is relatively low. (See PISCES Comments, p. 1.) EPA's Phase I rule should not remove this necessary, uncontroversial review from the permitting requirements for new cooling water intake structures.

Since design intake capacity is a substantive aspect of the proposed regulations, it is unnecessary and counterproductive to have any design intake capacity threshold for application of the regulations. All cooling water intake structures should be subject to the 316(b) regulations and those which already meet the regulation's flow standard will require no further modification to the capacity of the CWIS in order to comply.

Furthermore, as Dr. P.A. Henderson of PISCES Conservation, Ltd. notes, raising the threshold to even 5 MGD might allow a medium-sized power plant of approximately 300-400 MW to operate under the threshold. This may result in an increase of unregulated or underregulated facilities of this size, which cumulatively would have disastrous consequences. An example of power plant sizes

responding to regulatory thresholds recently occurred in New York City. Because the New York State siting law (Public Service Law, Article X) applies to new facilities of 80 MW or more, the New York Power Authority (NYPA) proposed this past winter to rapidly add approximately 400 MW of new power by siting a series of 48 MW turbines at eight or nine different sites throughout the City, thereby circumventing the Siting Board's jurisdiction.

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.529.014

Subject Matter Code	10.01
Regulatory Framework Options	

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Organization Riverkeeper

In the NODA, EPA states that 100% of the utility and nonutility combined-cycle plants built in the last 20 years have a closed-cycle recirculating cooling system. (66 FR 28855-28856.) For coal-fired facilities, 88% of the facilities built in the last 10 years have closed-cycle cooling. (66 FR 28856.) This empirical data is very powerful evidence that recirculation cooling systems can be successfully employed at power plants throughout the country. Furthermore, it renders preposterous EPA's Phase I proposal to allow new facilities to be built with once-through cooling systems. By permitting the most destructive type of cooling – which requires hundreds of millions of gallons of water per day – EPA's Phase I regulations represent a severe backsliding from current conventional technology. Such approach might cause many states to similarly lessen their standards, thereby inducing a reversion to older, more environmentally-damaging technology. This is wholly inconsistent with Section 316(b) and the technology-forcing goals of the Clean Water Act, and is unacceptable.

EPA also reports that the Department of Energy (DOE) has revised upward the projected growth in demand for electric generating facilities. (66 FR 28854.) EPA appears to have included this information as part of its effort to estimate the number of facilities that will be regulated by the Phase I regulation and to estimate the aggregate compliance burden imposed thereby. But an equally relevant and countervailing consequence of a greater number of generating facilities is an increase in adverse environmental impact which, under Section 316(b), must be minimized.

EPA Response

EPA agrees that data show that use of closed-cycle recirculation systems is a viable option across the nation and has under Track I of the two-track approach the capacity of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system and the design through-screen intake velocity is restricted to 0.5 ft/s. The two-track approach also allows for flexibility to accommodate site-specific conditions as long as the system meets the performance requirements in Section 125.84. Under the final rule EPA will allow once through cooling if the facility can meet the requirements commensurate with closed-cycle recirculating system. Some facilities may be located on huge waterbodies that are of low water quality and based on site-specific issues once through system could be supported if the requirements of Section 125.84 are met.

In this final rule EPA has set consistent national requirements for addressing adverse environmental impacts from cooling water intake structures that are more stringent than current 316b requirements. Therefore, the Agency believes that the comment that allowing once through cooling systems is backsliding is unfounded. For new facilities subject to this rule EPA chose the two-track option as the Agency believes it represents the best technology available for minimizing adverse environmental impact.

Comment ID 316bNFR.529.015

Subject Matter Code MISC

Miscellaneous Comment

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EPA states that it had not considered or projected impacts on offshore and coastal oil and gas drilling facilities in its Phase I proposal. (66 FR 28856.) As a result, EPA states that it is considering not including these facilities within the scope of the Phase I rule, and instead addressing them within the scope of the Phase II or Phase III rulemaking. (66 FR 28857.) As an initial matter, EPA is required by court order in Riverkeeper, Inc., et al. v. Whitman (U.S. Dist. Ct., S.D.N.Y., Case No. 93 Civ. 0314 (AGS)) to include in Phase I regulations all new facilities that employ a cooling water intake structure. Thus, while nothing prohibits EPA from soliciting public comment on the subject, redefinition of the scope of the three rulemaking phases is not a substantive matter solely within EPA's discretion. The plaintiffs and the Court must approve any such revision.

EPA also states that, alternatively, it is considering a higher regulatory threshold (25 or 50 MGD) for offshore and coastal oil and gas drilling facilities. (66 FR 28857.) This would be completely unauthorized and inappropriate. Section 316(b) requires minimization of impacts from cooling water intake structures. Exempting structures with a design capacity as large as 25 or 50 MGD would create an exception that, for offshore rigs, completely eviscerates the rule. Intakes with those volumes can kill significantly large numbers of fish. Moreover, as explained above, because a key substantive component of the rule is a flow volume limitation, and because there are other regulatory factors in addition to capacity, it makes no sense to also have a regulatory threshold based on volume. Instead, the substantive capacity limit in the regulation should function as a regulatory threshold for capacity, in that facilities with lower volumes would already be in compliance with that portion of the rule. At most, any regulatory threshold should be set at a de minimis level.

From a technical standpoint, it is highly questionable that offshore oil and gas drilling facilities would need higher intake velocities than other facilities to prevent biofouling. Virtually all facilities must address biofouling, whether their intakes are in coastal, estuarine, or inland waters. (See PISCES Comments, p. 1.) In fact, fouling by bacterial and fungal slimes, as well as by larger organisms, may be more severe in estuaries than the environments in which oil and gas rigs operate. (Id.) Most important, there is nothing particular about these facilities that would indicate they do not impinge and entrain, and thereby kill, fish. (Id.) As explained in PISCES November 2000 report, "When water is extracted from healthy natural waters, to an overriding degree the numbers of organisms killed be they fish, crustaceans, or members of the plankton increases with the volume of water pumped." (PISCES Conservation, Ltd., Technical Evaluation of US Environmental Protection Agency Proposed Cooling Water Intake Regulations for New Facilities, p. 27 (November 2000).) Statistical analysis conducted by scientists at PISCES indicated that volume was a far greater determinant of the number of animals killed than intake location or any other factor. (Id.) Furthermore, large offshore structures attract fish to a much greater extent than inshore structures, and as a result, have the potential to kill a greater number of fish. (See PISCES Comments, p. 1.)

If coastal and offshore oil and gas drilling facilities have different technology requirements for their cooling water intake processes, then the proper means to address this is not by setting a higher regulatory threshold, but by specifying BTA on an industry-specific basis. Indeed, this is how EPA

has promulgated virtually all of the other technology-based standards in the Clean Water Act. (See, e.g., 40 CFR Parts 423 et seq. [Steam Electric Power Generating Point Source Category])

EPA Response

EPA stated, in the Notice of Data Availability, that it was considering addressing offshore and coastal oil and gas extraction facilities in Phase II or Phase III, rather than Phase I. In its comments on the Notice, Riverkeeper questioned whether the Amended Consent Decree allowed EPA to do this. EPA and Riverkeeper conferred on August 23, 2001, to discuss this matter. EPA expressed the view that offshore and coastal oil and gas extraction facilities may properly be addressed in Phase II or Phase III. Riverkeeper agreed that they would not challenge EPA's position that it is permissible under the Amended Consent Decree for EPA to address these facilities in Phase II or Phase III.

See responses to comments 316bNFR.022.002 and 316bNFR.022.007.

Comment ID 316bNFR.529.016

Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

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Organization Riverkeeper

As explained above and in our November 2000 comments, EPA's proposal to define BTA with reference to waterbody type violates the Clean Water Act, and sacrifices certain waters of the U.S. on the theory that they are "less sensitive" than other waters. EPA is now soliciting comment on statements made by industry representatives that even the waterbodies deemed most sensitive by EPA – estuaries and tidal rivers – need lesser protection than proposed. These self-serving statements are legally and technically unsound, and it would be irresponsible for EPA to adopt any policy based upon them.

First, these industry commenters state that adverse environmental impact can be minimized on estuaries with less protective technology. (66 FR 28857.) This statement badly misconstrues the statutory terms "minimize" and "adverse environmental impact." Minimize means "to decrease to the least possible amount, degree, etc." (Webster's New World Dictionary of the American Language, Second College Edition, p. 905.) It is not synonymous with the word "reduce," in that any decrease is a reduction, but only a decrease to the least possible amount is minimization. By definition, minimizing an impact necessarily includes eliminating the impact, if possible. Thus, less protective technology may reduce but cannot minimize impacts, because more protective technology would reduce impacts further. Industry's statement also construes "adverse environmental impact" as something on the order of the "extirpation of a population" or the "extinction of a species." In fact, as explained above, cooling water intake structures, by their very existence and operation, cause adverse environmental impacts. The killing of adult and juvenile fish, eggs, and larvae by power plants is an adverse environmental impact in every plausible sense of that term. Section 316(b) mandates the best technology available to minimize impacts. That standard necessarily means that the most protective technology is required.

Industry also makes specious claims about the reproductive strategies of estuarine fish by stating, in essence, that the eggs and larvae killed by power plants are "surplus production" not needed or beneficial to reproductive success. (66 FR 28857.) Utilities have for years relied on vastly inflated estimates of compensation theory (density-dependence) to argue that the slaughter of aquatic life has little long-term significance for overall fish populations. As Dr. P.A. Henderson of PISCES Consulting, Ltd, explains, to the contrary, there is no evidence supporting the excessive density-dependent Beverton-Holt and Ricker curves which industry biologists rely on. (PISCES Comments, p. 1.) The density-dependence concept was also rejected in Boreman, 31 Environmental Science & Policy, 445-449. Even if population levels of certain species were the only aquatic ecological resources protected by Section 316(b), which they are not, there is no basis for reducing the proposed protection for estuaries or tidal rivers on the theory that aquatic organisms are merely surplus, or on any other theory. It is ironic that industry insists that Section 316(b) addresses a variety of environmental issues including energy supply and scenery, but ignores all aquatic ecology impacts except for population levels of certain fish species (and then systematically underestimates those impacts).

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted a set of requirements similar to the proposed estuarine and tidal river requirements, which now apply to all waterbody types and zones. Regarding use of the term "minimize," the final rule defines the term to mean to reduce to the smallest amount, extent, or degree reasonably possible, which is consistent with the commenter's statement. EPA also has discussed the phrase "minimizing adverse environmental impact" as used in 316(b) in other responses. See 316bNFR.206.014.

EPA agrees that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates. See preamble section VI.B.2.c and response to comment 316bNFR.039.010 for additional discussion.

Comment ID 316bNFR.529.017

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Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

EPA is considering changing the term "littoral zone" because this has a precise scientific meaning that may be at variance with the way it is defined in the proposed regulation. Rather than EPA's suggested alternatives of "area of potential high impact" or "productivity zone," Dr. Henderson suggests that a term like "beach and nearshore habitat" is worth considering with the extent of the nearshore defined by light and/or depth. Such term can be used in both fresh and ocean waters. (PISCES Comments, p. 2.) Legally, however, EPA lacks the authority to establish lesser BTA requirements, particularly for capacity, outside the nearshore habitat. Adverse environmental impacts are minimized by reducing capacity to the greatest extent possible both in and outside of this area.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.529.018

Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

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EPA's revised definition of estuarine water is an improvement over that originally proposed. However, there is no definition of the salinity of ocean water. The definition should also include some reference to temporal variation. One possibility, suggested by Dr. Henderson, would be to define ocean water as water that never declines below 33 parts per thousand at any part of the tidal cycle or time of year. (PISCES Comments, p. 2.) However, as explained above and in our November 2000 comments, EPA may not use these definitions to provide a reduced level of protection for oceans.

EPA Response

The revised definition for oceans does include salinity levels as follows:

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

EPA did not see the need to reference temporal variation in this definition.

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. See response to comment316bNFR.529.016.

Comment ID 316bNFR.529.019

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Subject Matter Code 12.22

Potential for Additional Measures for Unique Situations (Great Lakes)

As repeatedly explained, there is no legal basis for defining BTA, which is a technology-based standard, differently for different waterbodies based on local water quality characteristics. This is particularly true for capacity. While the Great Lakes are sensitive and important waters deserving of great protection, Section 316(b) requires that all cooling water intake structures in all waters of the U.S. of every type use the best technology available.

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.529.020

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

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EPA is considering statements of industry that freshwater aquatic species have reproductive and life history strategies that make them less susceptible to cooling intakes. (66 FR 28858.) As a result, EPA is considering lessening the proposed Phase I requirements for freshwater rivers and streams such that (1) once-through cooling would be allowed in all parts of these waterbodies; (2) additional design and construction technologies (not related to volume) would be required in all parts of these water systems. EPA's stated rationale for this change is that it would lower costs. (66 FR 28859.)

The suggested approach is legally and scientifically baseless. First, Section 316(b) requires that minimization of impacts from all cooling water intake structures, including those on freshwater rivers. Second, flow volume primarily determines the magnitude of fish kills and thus environmental impact; other design technologies work only at the margins to protect a comparatively small number of fish. Third, once-through cooling cannot possibly be considered BTA in any circumstances because it uses 50 to 100 times as much water as closed-cycle wet cooling and 2,500 to 10,000 times as much water as dry cooling, and increases the killing of fish and other aquatic organisms in roughly the same proportions. Fourth, freshwater species are extremely vulnerable to cooling intakes. As Dr. Henderson explains, there is evidence that freshwater intakes can impinge and entrain large numbers of fish. (PISCES Comments, p. 2.) Moreover, under industry's approach, the relative lower fecundity of freshwater fish may render these species more vulnerable than estuarine fish.

EPA Response

Even though EPA may have considered lessening the proposed Phase I requirements for freshwater rivers and streams such that (1) once-through cooling would be allowed in all parts of these waterbodies; (2) additional design and construction technologies (not related to volume) would be required in all parts of these water systems, the Agency abandoned this proposed option in favor of the two-track framework of the final rule. Thus, for the purposes of today's technology-based rule, there is no distinction among the different waterbody types at which an intake may be sited (please see response to comment 316bNFR.508.017.)

EPA agrees with the commenter that losses attributable to cooling water intakes are directly proportional to cooling water withdrawals. Today's technology-based rule seeks to minimize entrainment and impingement losses by reducing intake flows to levels commensurate with that which can be attained by a closed-cycle recirculating cooling water system.

EPA also agrees that facilities using once-through cooling can take in large volumes of cooling water, resulting in substantial entrainment and impingement impacts (see section III of today's preamble). For that reason, EPA is requiring reduction in intake flows to levels commensurate with that which can be attained by a closed-cycle recirculating cooling water system. Further, EPA is requiring additional design and construction technologies to be implemented to minimize impingement and entrainment of all life stages of fish and shellfish and to maximize survival of impinged life stages of

fish and shellfish.

EPA's record demonstrates flow reduction from once-through to recirculating wet cooling towers of approximately 92 to 95 percent. The reduction of flow from once-through to dry cooling is approximately 99 percent. Thus, the incremental difference between dry and wet cooling towers is approximately 4 to 7 percent. Regardless, EPA agrees with the concept presented by the commenter that flow reduction will mean reduction in adverse environmental impact.

Comment ID 316bNFR.529.021

Subject Matter Code	11.0
Best Technology Available-Location	

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Unlike prior statutory schemes, the 1972 Clean Water Act's technology-based limitations, such as BTA, are not set with reference to designated use of the receiving or source waters. The former law's approach of basing effluent limitations solely on designated uses was uniformly denounced and reject by Congress because it led to the progressive deterioration, rather than the restoration, of water quality. Now, EPA is proposing to return to that failed and unauthorized approach by considering an exemption from the Phase I rule for "waterbodies not designated to support an aquatic life use." (66 FR 28859.)

The Clean Water Act does not permit an exemption from any technology standards for dischargers of pollutants based on the uses designated for receiving waters. Thus, there cannot be an exemption for users of cooling water based on the uses designated for source waters.

EPA Response

The final rule does include this provision. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types, including "waterbodies not designated to support an aquatic life use." Thus, today's final rule does not establish less stringent requirements for waterbodies not designated to support aquatic life use. However, to the extent that the lack of an aquatic life use would result in Track I requirements achieving limited reductions in impingement and entrainment at a site, a permit applicant willing to conduct site-specific studies under Track II might be able to demonstrate that alternative technologies or approaches would reduce the level of impingement and entrainment as Track I at that location.

Comment ID 316bNFR.529.022

Subject Matter Code	9.4
Adverse Environmental Impact	

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EPA is considering whether to define adverse environmental impact (AEI) – as suggested by industry – using a population endpoint. EPA is also considering defining AEI with reference to counts of impinged and entrained organisms. (66 FR 28859.) Industry's proposal in this regard is based on the following statement quoted in the NODA: "individual organisms, large numbers of individual organisms, or subpopulations are not ecologically relevant." (66 FR 28859 [emphasis added].) The designated use of waterbodies is an inappropriate mechanism for basing modern technology standards, particularly for migratory fish, because the designations may have little relation to underlying ecological value. Since organisms are plainly part of the environment, adverse impacts on organisms are adverse impacts on the environment, which must be minimized under the statute. In reliance on the bizarre notion that the environment is not adversely affected until "desirable" species are driven to the brink of extinction, industry urges EPA to define AEI as follows:

a reduction in one or more indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, and (2) is attributable to the operation of the cooling water intake structure. (66 FR 28859.)

At best, industry's perspective reflects benighted notions of environmental management at odds with the Clean Water Act and other modern laws. Industry's proposal would disregard the impacts of cooling water intake structures by exempting them from regulation until there is a threat of crash for key populations. This would foster a kind of brinksmanship with local populations and ecosystems, and would rely on a level of scientific awareness by regulators and permittees far beyond what can practically be expected. It would also allow significant diminution in population numbers, as long as such a crash was not apparently imminent, despite the manifest public interest in abundant fisheries. Nothing in the Clean Water Act's injunction to "minimize adverse environmental impact" contemplates such a cavalier and destructive regulatory scheme, which is dramatically at odds with the Act's basic purpose to "restore and maintain the … biological integrity of the Nation's waters." (33 U.S.C. § 1251(a).)

Moreover, the premise is wholly incorrect ecologically. Organisms, particularly large numbers of them and subpopulations are ecologically relevant and a large number of dead fish is in every sense of the term adverse environmental impact. Furthermore, larger ecological communities, consisting of hundreds of different species interacting with each other, i.e., ecosystems, are also ecologically relevant. However, it is often difficult to detect subtle changes to an ecosystem, or to pinpoint whether these changes, or even detectable shifts at the population level, are "attributable to the operation of the cooling water intake structure."

EPA Response

See response to comment 316bNFR501.003.

Comment ID 316bNFR.529.023

Subject Matter Code 9.4

Adverse Environmental Impact

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In fact, EPA need not formally define AEI in the regulations, and should not promulgate a threshold level of ecological damage before requiring BTA. The construction and operation of cooling water intake structures causes adverse environmental impacts in that it reduces levels of biotic resources, as measured by any number of ecological indices: population size, biomass, potential biomass and forage for predators, capacity for energy transfer across trephine levels, etc. A completely natural environment, free from human interference, is the ideal. While that may not be fully achievable, minimization of adverse impacts must strive towards that goal to the greatest extent possible. Industry focuses on the wrong terms in the statutory language. Rather than defining AEI, implementing Section 316(b) requires a focus on technologies that minimize the impacts to organisms and habitat that all intake structures cause. Minimization of AEI is the critical mandate, and minimization of at least the aquatic impacts requires limiting the use of cooling water as much as possible.

EPA Response

EPA agrees with the comment. The focus of today's rule is on using best technology available to minimize any adverse environmental impacts.

Comment ID 316bNFR.529.024

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

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The electric generating industry's research group, the Electric Power Research Institute (EPRI) and its legal and lobbying arm, the Utility Water Act Group (UWAG), assert: a) that the entrainment of very large numbers of early stage fish does not necessarily meaningfully affect populations; and b) substantial percentages of many species may survive entrainment. (66 FR 28860.) However, as Dr. Henderson explains:

It is never possible to demonstrate that a large number of deaths has had a negligible effect on population number because it is not possible to know what the population would be if the deaths had not occurred. Therefore assertion a) is made on the basis of modelling studies which require the existence of some form of compensatory response. (PISCES Comments, p. 2.)

In other words, industry's assertion assumes the existence of the very result it seeks to prove. Moreover, "[w]hat these models and arguments fail to address is why fish have evolved to have such a high fecundity if it is not required. High fecundity places great demands upon the individual and evolutionary theory clearly asserts that it would not have evolved if it were not advantageous." (Id.)

If EPA is considering adopting a compensation theory or density-dependent model approach to these regulations, the agency is on unsound legal and scientific ground.

EPA Response

Please see responses to comments 316bNFR.507.004 (AEI interpretation/fish population assessments), 316bNFR.068.015 (compensation) and section VI.B.2 of the preamble for today's rule.

Furthermore, cooling water intakes "may result in a change in the competitive balance and an alteration away from the equilibrium community." (Id.) <fn2> These impacts were explained in some detail in PISCES November 2000 comments on the proposed Phase I rule (Henderson and Seaby, Technical Evaluation of U.S. Environmental Protection Agency Proposed Cooling Water Intake Regulations for New Facilities, November 2000, pp. 24-27.) Further critiques of compensation models can be found in another report previously submitted to EPA (Technical Comments on the Draft Environmental Impact Statement for the State Pollutant Discharge Elimination System Permit Renewal for Bowline Point 1 & 2, Indian Point 2 & 3, and Roseton 1 & 2 Steam Generating Stations, June 2000,) and a draft manuscript submitted herewith ("The use and abuse of density-dependent models for the assessment of the impact of power station cooling water intakes on fish populations, February 2001), as well as the aforementioned paper by John Boreman (Boreman, 2000).

EPRI's claim that some of the best fisheries scientists in the world have never identified a site where definitive or conclusive population or community level impacts have occurred from the operation of cooling water intake structures is simply wrong. To the contrary, fish populations subjected to cooling water related mortality have not always remained healthy. First, there is ample evidence of modest community level changes. Intake structures can create new environments that attract fish that did not previously live in the area. (PISCES Comments, p. 3.)

Second, there are many examples of fish populations that have been devastated in the vicinity of, and as a result of cooling water intakes. For example, as EPA has acknowledged, Mt. Hope Bay experienced a progressively steady rate of decline (up to an 87 percent reduction) in finfish species of recreational, commercial, and ecological importance as a result of the Brayton Point plant's cooling water intakes. (65 FR 49073, citing Gibson (1996).) Additional evidence of the devastating impacts of the Bayton Point plant on fish populations in Narragansett Bay is provided in Comparison of Trends in the Finfish Assemblage of Mt. Hope Bay and Narragansett Bay in Relation to Operations at the New England Power Brayton Point Station, which was submitted to EPA today under separate cover by John Torgan, the Narragansett BayKeeper. This report documents the decline of fish populations in Mount Hope Bay, MA and RI, coincident to increases in entrainment and cooling water use by the Brayton Point Power Plant, now owned by PG&E. Also submitted to EPA by the Narragansett Baykeeper is a single figure excerpted from a 1998 PG&E Generating Annual Report on biological and hydrological monitoring activities at Brayton Point, showing numbers of larval winter flounder entrained annually by the facility, ranging from near 100 million to one billion per year. Together with recent scientific studies, these data represent a profound and extensively documented population-wide negative impact from the cooling water intake process.

On the Hudson River in New York, entrainment studies of five power plants (Indian Point, Bowline, Roseton, Lovett and Danskammer) predicted year-class reductions of up to 79 percent, depending on fish species. (65 Fed. Reg. at 49073, citing John Boreman and Phillip Goodyear, Estimates of Entrainment Mortality for Striped Bass and Other Fish Species Inhabiting the Hudson River Estuary, American Fisheries Society Monograph 4:152-160, 1988.) At the San Onofre Nuclear Generating

Station on the Southern California coast, within 3 kilometers of the plant, the density of queenfish and white croaker in shallow-water samples decreased by 34 and 63 percent, respectively. Queenfish declined by 50 to 70 percent in deepwater samples. (65 FR 49073, citing S. Swarbrick and R.F. Ambrose (1989).)

Other instances where substantial population change has been observed which may be linked to cooling intake impacts are in the Severn Estuary and Bristol Channel, England. Until about 10 years ago, those waterbodies supplied water for seven power plants with an individual generating capacity of up to 2000 MW, each with once-through cooling systems. Five of these plants have now closed, and a study of the fish and crustacean populations has demonstrated a clear increase in the abundance of many fish and crustaceans has been observed. (PISCES Comments, p. 3.)

Footnotes

2 As Dr. Henderson explains:

It is exceedingly difficult to estimate entrainment mortality and this may vary with the operating conditions. Further, fish eggs and larvae are sensitive to environmental conditions and their development may be affected by shocks such as a sudden increase in temperature. Such changes may not be immediately lethal, but could make it even more unlikely that a larva would not survive to adulthood. There can be no doubt that entrainment can be highly damaging and lethal. Numerous factors come into play including temperature changes, pressure, mechanical damage and biocide toxicity. In addition, predators are frequently observed lurking at outfalls to eat disabled individuals. It would therefore be unwise to base regulation on the possibility that some species or individuals may have low, but unknown, mortality rates.

(PISCES Comments, p. 2.)

EPA Response

EPA agrees with the commenter that the operation of cooling water intakes can result in changes in the competitive balance and an alteration away from the equilibrium community. EPA is concerned about changes of this nature which are more subtle and more difficult to detect or measure unlike impingement or entrainment. As EPA has pointed out elsewhere in the Preamble and Response to Comments, it may require extensive data sets, encompassing 20 or more years of data, to adequately assess whether or not populations are being affected by intakes.

EPA would also point out that changes in aquatic populations and communities are not the only way to assess the impact of cooling water intakes. Moreover, EPA has provided documentation that there are multiple stressors impacting aquatic resources and cooling water intakes are just one of these stressors. EPA agrees that cooling water intakes do adversely impact fishery resources in many ways, further, EPA believes that Mt. Hope Bay and the Hudson River are two examples of situations where multiple stressors, including cooling water intakes, have adversely affected aquatic resources.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes and the issues raised in this comment please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Moreover, the standard that EPRI suggests (that the impacts from the intakes be "definitive" or "conclusive") is nearly impossible to meet in fisheries biology. As Dr. Henderson explains, population level effects in wide ranging fish have been relatively infrequently detected and attributed to cooling intakes for several reasons. First, there has been little support for before and after studies of sufficient duration to allow effects to be detected. At least 10 years of data both prior and post commissioning of a plant would be required for any effect to be detectable. Second, many power plants are located in water bodies that are already impaired due to pollution, habitat removal, and over fishing, making it difficult to attribute impacts to cooling intakes as opposed to the other man made changes. Such overlapping of effects is present in the Hudson Estuary where changes in the commercial fishing regime and water quality have made it impossible to link any deleterious changes to the power station intakes. However, in the Hudson Estuary it has clearly been demonstrated that there have been considerable changes in fish populations over the last 30 years. While striped bass have greatly increased in number (due to reduced fishing), many other species including white perch and tomcod have declined. The influence of the numerous cooling water intakes in bringing about these changes cannot be quantified, but it is possible that power plants are having an effect. From a consideration of the long-term studies that do exist it is clear that substantial changes have been observed in fish populations and communities living in the vicinity of power plant cooling water intakes. (See PISCES Comments, p. 3.) EPA acknowledges this in its suggestion that "impingement and entrainment, in combination with other factors, may be a non-trivial stress on a waterbody." (66 FR 28861.)

Even where fish populations may in some cases stabilize over time even in presence of cooling intakes, this may be because the introduction of the intake and its initial operation effectively wiped out the community of fish that used to live in that area. In some cases this can be quite dramatic, such as the case of one East Coast British power station discussed by Dr. Henderson. At this facility, when the pumps were first operated large numbers of starfish were impinged on the screens. However, within a few weeks the numbers declined and now more than 10 years later they are hardly ever caught. "Presumably, when first switched on, the power station sucked in the starfish living within the cooling water intake and its immediate vicinity. Once this population had been exhausted, there was a great decline in impingement." (PISCES Comments, p. 3.) At some Hudson River power plants there are recorded examples of a decline in fish impingement with time after the commencement of operation. (Id.) The fact the loss of an abundant community of fish that frequented a particular area of a water body and has not been replaced clearly constitutes adverse environmental impact that must be minimized.

The claim by EPRI also does not consider the cumulative effects of multiple plants on large, geographically extensive populations. A common feature of marine fish is the use of estuarine environments for part of the juvenile phase. If most of the estuaries available to the species are also used for cooling water, then, over the entire geographical range, extremely large entrainment and impingement losses may occur. (See PICSES comments, p. 3, and Henderson, P.A., Are coastal power stations affecting Northern European inshore fish populations? (submitted herewith and

available at www.powerstationeffects.co.uk).)

EPA Response

EPA agrees that it can be difficult to establish population effects caused by cooling water intakes. As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. Thus, population-level assessments are particularly unsuitable for meeting a permitting decision in either Track I or Track II for new facilities. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and availability of state-of-the-art fish population models. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also believes that existing population models are limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems to forms of disturbance such as entrainment and impingement (see preamble section VI.B.2.c).

EPA also agrees that the potential for cumulative impacts to fish populations caused by multiple intakes requires consideration and additional research. Ongoing efforts to assess the effect of multiple intakes on Atlantic Coast fisheries are discussed in preamble section VI.B.2.c.

Comment ID 316bNFR.529.027

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Subject Matter Code 9.45

Request for Comment: Adapt 316(a) Standard

EPA is also considering defining AEI with reference to Clean Water Act section 316(a), which allows the lessening of thermal discharge limitations so long as they assure "the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on that body of water." (66 FR 28862.) However, it is quite clear that Congress intended that standard to apply only to thermal discharges. In contrast, Section 316(b) applies to intakes, not discharges, which have a different set of impacts. Moreover, the function of the two sections is different. Section 316(a) is a variance from the BAT and NSPS technology-based standards for discharges; Section 316(b) is itself a technology-based limitation. Legislative history indicates that Congress believed that thermal pollution was more benign than chemical pollution because it may dissipate more quickly and in some cases may be beneficial. But that is clearly not the case with the impacts caused by cooling intakes. Because the fish are typically killed on contact with the intake, the impacts are more immediate than those caused by either chemical pollutants or heat. Had Congress intended to provide identical standards for Section 316(a) and 316(b), it could have so indicated. It did not.

EPA Response

Please see responses to comments 316bNFR.026.013, 316bNFR.068.008, and the preamble to the final rule. EPA agrees with the comment.

Comment ID 316bNFR.529.028

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

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EPA is also considering defining AEI as a level of impingement and entrainment that is "recurring and nontrivial." (65 FR 49074; 66 FR 28863.) As noted above, at start-up, a new power plant may kill off most of the population of fish that had frequented that area around the intake. Impingement may drop off substantially after that because the plant has wiped out the local fish community. Thus, fish kills may be non-recurring, but significant, adverse, and troubling nonetheless. Any nontrivial level of impingement and entrainment is clearly adverse environmental impact.

EPA is considering defining "recurring and nontrivial" impacts as the degree of impingement and entrainment that resulted from the use of traditional technologies in 1972 when the Clean Water Act was enacted. (66 FR 28863.) Clearly, Congress was concerned about the massive fish kills occurring and reported at that time. But the Section 316(b) regulations must minimize those fish kills, i.e., reduce them to the greatest extent that currently available technology can achieve. "Reasonable requirements to improve [1972] performance" does not meet the BTA standard (emphasis added).

All of these alternate approaches fail because they assume that significant, observable, population level damage is the only impact of concern to Section 316(b). They utterly ignore the public interest in thriving, healthy ecosystems, which is at the core of the Clean Water Act.

The following statement in the NODA is the only legally-permissible way to interpret Section 316(b) and should be adopted by the agency:

[t]he phrase "best technology available to minimize adverse environmental impact" could be interpreted in a way that focuses on the technology, rather than the impact, in a manner analogous to the technology-based standards applicable to point source dischargers under Clean Water Act sections 301, 304, and 306. (66 FR 28863.)

Any other approach will fail to survive judicial review.

EPA Response

Please see response to comment 316bNFR.040.003. Today's rule focuses on best technology(ies) available to minimize entrainment and impingement.

Comment ID 316bNFR.529.029

Subject Matter Code 10.16

Two Track Process

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EPA has invited comment on, and appears to be seriously considering, a power industry approach to the Phase I regulation, which is variant on the "rebuttable presumption" approach outlined at proposal. (66 FR 28868.) The industry approach would give permit applicants as choice of two approval tracks: Track 1 would be a fast-track alternative in which the company commits to install "highly protective technologies in return for expedited permitting without the need for pre-operational or operational studies in the source waterbody." (Id.) Track 2 would involve site-specific studies to determine the required technology. (Id.) Such approach, and the explicit and implicit principles on which it is based, are not in accordance with law, science, environmental protection or even common sense.

First of all, despite that Track 1 ostensibly requires pre-determined, highly protective technologies, the NODA includes as candidate fast-track technologies once-through cooling deployed with wedgewire screens, traveling fine mesh screens, and Gunderbooms, where the applicant can demonstrate (without a study) the "reasonable equivalence" of this technology. (66 FR 28868.) Not only would such approach sanction the most consumptive, damaging available technology, but it would eliminate any studies to prove its effectiveness, resulting in the worst of all scenarios.

Secondly, the industry proposal assumes that closed-cycle cooling "eliminates" AEI, thereby "exceeding the section 316(b) standard of protection." (66 FR 28868.) This is wrong on several counts. Because minimization of impacts includes elimination of them where possible, it is impossible to exceed the statutory standard. And because dry cooling reduces water withdrawals and fish kills by approximately 98% over closed-cycle wet cooling, closed-cycle cooling does not even minimize adverse aquatic impact.

Third, applicants have always had, and will continue to have, the opportunity to propose a "highly protective technology," i.e., dry cooling, and such applications tend to be approved much more quickly than applications which propose to use prodigious quantities of water. Fourth, a uniform dry-cooling rule would yield the most expeditious permitting process. No studies of impingement and entrainment would be necessary.

For the reasons stated herein, and those stated in our November 2000 comments regarding the rebuttable presumption and case-by-case approaches (see pp. 37-46), EPA should summarily reject the industry proposal.

EPA Response

EPA is not adopting the industry's two-track approach in full. See preamble section V.D. EPA believes that today's final rule's requirements reflect best technology available for minimizing adverse environmental impact. See section V.C for discussions on why EPA is not adopting dry cooling as the best technology available for minimizing adverse environmental impact. EPA further believes that the two track approach will achieve the goals of the Clean Water Act because it reflects best technology

available for minimizing adverse environmental impact, but at the same time, it provides for innovation and flexibility without sacrificing comparable environmental performance. See section V of the preamble for the discussion on the basis of today's rule.

Comment ID 316bNFR.529.030

Author Name David K. Gordon & Reed W. Super

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Subject Matter Code 18.1

Elimination of "Wholly Disproportionate" Cost Test

EPA is inviting comment on whether it should use the "wholly disproportionate" cost-benefit test that has been previously used in many cases-by-case Section 316(b) determinations. (66 FR 28871.) As explained above, because Congress did not enumerate costs as a factor in Section 316(b), the agency is not entitled to consider them. Moreover, there is an additional problem with EPA's treatment of costs. EPA has proposed to create two junctures in the regulatory/permitting process at which the costs are a factor. First, EPA has taken costs into account in developing the requirements for the technology standards for the Phase I rule. Second, EPA is proposing to prescribe a cost test for permit writer to use in deciding to deviate from those regulatory standards in issuing a specific NPDES permit. Rather, Congress intended EPA to establish BTA limitations based on environmental considerations and for permit writers to include those technology limitations in permits, without regard to costs.

In circumstances where costs may be considered, cost/benefit tests are always biased in favor of the costs, because environmental benefits are difficult to quantify. A natural, healthy, pristine environment with fully-functioning ecosystems is extremely valuable to society, but inherently difficult to put a price tag on. As explained above the costs of the best technology available (dry-cooling) and the costs of any closed-cycle cooling system are negligible. At 0.01 to 0.27 cents per kilowatt hour, such costs provide no impediment to protecting the Nation's aquatic environments.

EPA Response

EPA disagrees with the commenter's claim that the Agency is prohibited from taking costs into account in establishing BTA limitations." See also response to comment 316bNFR.206.014 in comment category 10.11. EPA believes that the technology-based approach examines the costs to the industry affected, not just the ratepayers/consumers. For a discussion regarding the policy behind the alternative requirements provisions please see response to comment 316bNFR.053.021.

EPA also disagrees with the commenter's estimates of incremental costs and the percent increase in energy costs for the closed-cooling systems. As discussed in response to comment 316bNFR.529.501, EPA believes that the Tellus report cited by the commenter seriously misrepresents the costs for these cooling system types. As a result, EPA questions the commenter's conclusions about their effect on energy costs (see also comment 316bNFR.529.009).

Comment ID 316bNFR.529.031

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPA has taken a deeply flawed proposal which failed to comply with law or protect the environment, and has made it worse. The agency appears to be buying into industry's ludicrous suggestions that the killing of millions of fish is not adverse environmental impact; that 1950's cooling technology is the "best available" because it is cheaper than state-of-the-art technology; and that closed-cycle and dry-cooling systems pose an unwarranted burden even though they have already become the technology of choice for a majority of plant owners.

Industry can clearly comply with a uniform dry-cooling rule (and likewise with a uniform closed-cycle cooling rule) without any material effect on U.S. energy supply, reliability or cost. If power generators could not operate with dry cooling, they would not be proposing it with such frequency. If all ten dry-cooled plants proposed for New York State were built, the State would have an ample supply of electricity such that no additional plants (and no additional use of cooling water) would be required for some time. Indeed, such additional supply of power would allow older, more damaging plants to be retired. The same conditions hold true throughout the nation. Moreover, the costs of installing dry cooling as BTA, at a fraction of a cent per kilowatt hour, would not be felt or even noticed by consumers. EPA should mandate a capacity limitation for cooling water intakes structures commensurate with that which can be achieved with a dry-cooling system.

EPA Response

EPA disagrees with the commenters assessment of the proposed rule and notice of data availability as "deeply flawed."

EPA also disagrees with the statement that "the agency appears to be buying into industry's ludicrous suggestions that the killing of millions of fish is not adverse environmental impact." To the contrary, EPA considers mortality from impingement and entrainment of aquatic organisms to be the key component of adverse environmental impact.

EPA also disagrees with the statement implying that once-through cooling (or as the commenter refers to it: "1950's cooling technology") is considered the candidate for best technology available for minimizing impingement and entrainment. To the contrary, the final rule and record clearly demonstrate that the Agency views once-through cooling to impose significant adverse environmental impacts in many demonstrated cases and encourages flow reduction accordingly.

Regarding the assertions made by the commenter that "industry can clearly comply with a uniform dry-cooling rule…without any material effect on U.S. energy supply, reliability or cost," see response to comments #316bNFR.206.014 and #316bNFR.529.009.

Comment ID 316bNFR.529.101

Subject Matter Code	7.4
Water Withdrawal threshold	

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Organization Riverkeeper

The regulatory threshold.

The EPA data shows that 100% of utilities commissioned in the last 10 years would be regulated by a 2 MGD threshold. This would decline to 50% if a 15 MGD were applied. It is noted that even a 15 MGD threshold would still cover 97.3% of total flow. However, with the move to combined cycle gas turbines with lower water requirements per unit of electricity generated, a 15 MGD threshold might, in the future, not cover such a high proportion of the total flow. For example, a 750 MW combined cycle station with evaporative cooling towers would require about 7 to 8 MGD. It would be undesirable to remove such a large plant from the regulatory system, as an incorrectly designed and positioned intake for such a station could entrain an appreciable number of fish. For this reason I consider that the Maryland threshold of 10 MGD is also too high. A 5 MGD threshold is worth considering. However, if implemented, this might result in an advantage to plant in the 300 – 400 MW generating capacity range that was just below the regulatory threshold. This might have undesirable consequences if it resulted in the proliferation of small intakes each of which has local ecological impacts. The 2 MGD threshold thus seems the most desirable volume per day

EPA Response

Comment supports the rule; no response needed.

Comment ID 316bNFR.529.102

Subject Matter Code MISC

Miscellaneous Comment

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Offshore oil exploration facilities

We had not anticipated that the offshore oil industry would be covered by the proposed regulations and that mobile gas and oil extraction facilities would be considered new sources when they moved to a new development. The operators note that higher cooling water intakes velocities are necessary in marine waters to control biofouling of intake structures. I doubt if this is correct, biofouling in estuaries and freshwaters caused by mussels and zebra mussels can be extremely problematical if not carefully managed. Further, the build-up of bacterial and fungal slimes in condenser tubes is a common feature of fresh and estuarine waters. One reason why biofouling can be a problem in estuarine waters is the high nutrient availability that results in high productivity. Offshore ocean waters are often less productive than estuarine waters and so their community may actually take longer to foul a new surface. I have not been able to identify any data that demonstrates the need for higher velocities for offshore facilities. There seems nothing particular about these intakes that would suggest that they would not entrain or possibly impinge fish. Indeed, large structures placed offshore are known to attract fish so these facilities have the potential to attract and impinge. In contrast, inshore intakes are rarely so particularly attractive, as the coast affords a wide range of natural structures. Therefore, I can see no reason why they should be excluded from the proposed regulation. It would, however, seem reasonable to make some special consideration for their mobility. Perhaps they could not be considered a new facility if they remained with a defined ecological zone.

EPA Response

See responses to comments 316bNFR.022.002 and 316bNFR.022.007.

Comment ID 316bNFR.529.103

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Tidal Rivers and Estuaries

Some commentators have asserted that the large numbers of offspring produced by many fish would not survive and thus they can be killed by power plant without adverse effects. There is no basis in this argument. First, there is no evidence that a density-dependent response of the Ricker, Beverton-Holt or similar type is operating in most fish populations. A critique of the use of density-dependent models in power plant assessment was recently completed by Henderson, P. A. for presentation at the American Fisheries Society meeting in August 2001 and is attached to this document. Secondly, they are assuming the existence of surplus production. Perhaps the most devastating critique of this concept was that of J. Boreman (2000) in Environmental Science & Policy, 31, 445-449.

Over the last 20 years there has developed a considerable literature reporting the important role of estuaries for the juvenile stages of many abundant marine fish species. The juveniles probably use estuaries as nurseries because of their exceptional productivity. It is the dominance of juvenile fish in estuarine ecosystems that makes estuarine communities particularly vulnerable to cooling water intakes. This is because small, juvenile, fish are far more likely to become entrained or impinged. In some cases this is probably because they have a lower swimming speed. It may also be related to the tendency of juvenile fish to prefer edges, shallows and structures to more open water habitat. Another feature of estuaries is the comparatively high turbidity of the water when compared to ocean sites. Fish may not see an intake in turbid water until it is too late to swim away.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, and need for protection beyond the littoral zone. Therefore, EPA adopted a set of requirements similar to the proposed estuarine and tidal river requirements, which now apply to all waterbody types and zones.

EPA agrees that there are some weaknesses and potential inaccuracies inherent to the methods currently used to estimate compensation (e.g., extensive data requirements, limited data for nonharvested species, limited consideration of multiple stresses and the potential for depensation). Given these issues, EPA is concerned about the uncertainty of estimating compensation accurately and supports additional research that will expand fishery data sets and increase the certainty of compensation estimates. See preamble section VI.B.2.c and response to comment 316bNFR.039.010 for additional discussion.

Comment ID 316bNFR.529.104

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

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Organization Riverkeeper

Littoral zone

The EPA is considering changing the term “littoral zone” because this has a precise scientific meaning that may be at variance with the way it is defined in the proposed regulation. Such a change would reduce confusion and therefore seems sensible. The problem is to find a suitable alternative phrase. The suggested alternatives of “area of potential high impact” or “productivity zone” define the area by vulnerability or productivity rather than by locality. Perhaps a term like “beach and nearshore habitat” is worth considering with the extent of the nearshore defined by light and/or depth. This term can be used in both fresh and ocean waters.

EPA Response

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody.

Comment ID 316bNFR.529.105

Subject Matter Code 10.013

Estuary/Tidal River--Proposed Standards

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Revised definition of Estuary and ocean waters

The revised definition of estuarine water is an improvement over that originally proposed in that it would include waters of 30 parts per thousand and above as these are measurably dilute when compared with full ocean water. However, there is no definition of the salinity of ocean water, perhaps a value of 33 parts per thousand would be acceptable. Further, it would be useful if the definition also included some reference to temporal variation. One possibility would be to define ocean water as water that never declines below 33 parts per thousand at any part of the tidal cycle or time of year.

EPA Response

See response to comment 316bNFR.529.018.

Comment ID 316bNFR.529.106

Subject Matter Code	10.011
River/Stream--Proposed Standards	

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Organization Riverkeeper

Freshwater Rivers and Streams

It is suggested that the life history strategies of freshwater fish make them in general less vulnerable to cooling water intakes. In particular, entrainment will be reduced because the eggs are frequency attached to the bed or placed in a nest. However, there are many small freshwater fish species that will still be vulnerable to entrainment after metamorphosis to the adult form when they will tend to disperse widely. There is evidence that freshwater intakes can both entrain and impinge large numbers of fish. Given the relatively low fecundity of freshwater fish that build nests or attach large eggs to the bed, it could be argued that these species are particularly vulnerable to cooling water intakes as a higher proportion of their young need to survive to maintain the species. Further, freshwaters with connections to the sea can hold species such as eel that when young and first migrating into freshwater are particularly vulnerable to entrainment. To conclude, freshwater fish has not evolved to cope with cooling water intakes any more than have marine or estuarine fish, therefore there is no reason to assume they will be less vulnerable. A reduced vulnerability during one part of the life cycle may be followed by higher vulnerability at a later stage.

I therefore think it would be inadvisable to eliminate the proposed requirement to reduce capacity to a level commensurate with use of a closed-cycle cooling system for intakes within 50 m of the littoral zone. The suggestion that impingement and entrainment could be minimised by technologies such as fine mesh screens or fish return technology would be to place reliance on methods that are unproven or known to be only partially effective. To formalise their use within the regulations would be unjustified.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. EPA has removed the waterbody classification approach based on legitimate concerns brought up by commenters about definitions, national application, need for protection beyond the littoral zone, and need for consistent protection of all waterbody types. EPA adopted the most stringent set of requirements proposed (e.g., the proposed estuarine and tidal river requirements) which now applies to all waterbody types and zones. Therefore, this rule does not afford less restrictive requirements for rivers and streams. See response to comment 316bNFR.524.018.

The two-track approach in final rule requires either a reduction in intake flow commensurate with closed cycle cooling (as well as intake velocity and proportional, waterbody-based requirements) or the same level of impingement and entrainment reduction achieved through different means. The Track I technology-based performance requirements represent BTA for cooling water intake structures and directly address intake capacity. The Track II requirements achieve that same level of performance as those in Track I that limit capacity. EPA does not require that any particular

technology be installed (e.g., fine mesh screens or fish return technology) but requires that the facility meet the performance requirements outlined in Section 125.84.

Comment ID 316bNFR.529.107

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Assessment of Population Modelling Approach

EPRI and UWAG assert a) that the entrainment of very large numbers of early stage fish does not necessarily meaningfully affect populations and b) substantial percentages of many species may survive entrainment. It is never possible to demonstrate that a large number of deaths has had a negligible effect on population number because it is not possible to know what the population would be if the deaths had not occurred. Therefore assertion a) is made on the basis of modelling studies which require the existence of some form of compensatory response. What these models and arguments fail to address is why fish have evolved to have such a high fecundity if it is not required. High fecundity places great demands upon the individual and evolutionary theory clearly asserts that it would not have evolved if it were not advantageous. Effectively, intakes are reducing average fecundity of the species present to differing degrees depending upon their vulnerability. In the long-term this may result in a change in the competitive balance and an alteration away from the equilibrium community.

It is exceedingly difficult to estimate entrainment mortality and this may vary with the operating conditions. Further, fish eggs and larvae are sensitive to environmental conditions and their development may be affected by shocks such as a sudden increase in temperature. Such changes may not be immediately lethal, but could make it even more unlikely that a larva would not survive to adulthood. There can be no doubt that entrainment can be highly damaging and lethal. Numerous factors come into play including temperature changes, pressure, mechanical damage and biocide toxicity. In addition, predators are frequently observed lurking at outfalls to eat disabled individuals. It would therefore be unwise to base regulation on the possibility that some species or individuals may have low, but unknown, mortality rates.

EPA Response

Please see responses to comments 316bNFR.507.004 (AEI interpretation/fish population assessments), 316bNFR.068.015 (compensation), 316bNFR.501.015 (impingement and entrainment mortality), and section VI.B.2 of the preamble for today's rule.

Comment ID 316bNFR.529.108

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name David K. Gordon & Reed W. Super
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EPRI asserts that some of the best fisheries scientists in the world have never identified a site where definitive or conclusive population or community level impacts have occurred from the operation of cooling water intake structures. This statement is rather misleading and gives the false impression that fish populations subjected to cooling water related mortality have always remained healthy. This is not the case. First it should be noted that there is considerable evidence that intake structures can create new environments that attract fish that did not previously live in the area. Therefore modest community level changes have been frequently detected. There are two general reasons why population level effects have rarely been detected in wide ranging fish. First, there has been little support for before and after studies of sufficient duration to allow effects to be detected. It is likely that at least 10 years data both prior and post commissioning of a plant would be required for any effect to be detectable. Second, many power plants have been sited in habitats which have been subject to multiple insults including over fishing and high levels of pollution. Thus it has proved impossible to disentangle the power station effect from that caused by all the other man made changes. This type of confusion is evident in the Hudson Estuary data where changes in the commercial fishing regime and water quality have made it impossible to link any deleterious changes to the power station intakes. However, in the Hudson Estuary it has clearly been demonstrated that there have been considerable changes in fish populations over the last 30 years. While striped bass have greatly increased in number, many other species including white perch and tomcod have declined. The influence of the numerous cooling water intakes in bringing about these changes cannot be quantified, but it is possible that power plants are having an effect. Another example where substantial change has been observed which may be linked to power station impacts is the continuing study of the fish and crustaceans of the Severn Estuary. The Severn Estuary and Bristol Channel, England, until about 10 years ago supplied water for 7 direct-cooled power stations with an individual generating capacity of up to 2000 MW. Five of these plants have now closed. A study of the fish and crustacean populations commenced in 1980 and since the closure of the plants a clear increase in the abundance of many fish and crustaceans has been observed. Unfortunately, the last decade has also been a period of gradual warming of the water linked to large-scale climatic change. Therefore these changes could also be related to global warming. There is only one certain statement that can be made. From a consideration of the long-term studies that do exist it is clear that substantial changes have been observed in fish populations and communities living in the vicinity of power plant cooling water intakes.

Another type of observation that suggests that cooling water intakes are having an effect on local populations is the frequently expressed observation that the catch when the station was first brought into operation gradually changed. In some cases this can be clearly seen and is quite dramatic. For example, in one East Coast British power station, when the pumps were first operated large numbers of starfish were impinged on the drum screens forming an amazing sight. However, within a few weeks the numbers declined and now more than 10 years later they are hardly ever caught. Presumably, when first switched on, the power station sucked in the starfish living within the cooling water intake and its immediate vicinity. Once this population had been exhausted, there was a great decline in impingement. I have heard similar claims at many power plants although there are few cases where the effect has been quantified. It is notable that at some Hudson power plants there are

recorded examples of a decline in fish impingement with time after the commencement of operation.

The claim by EPRI does not consider the effects of multiple plants on large, geographically extensive populations. A common feature of marine fish is the use of estuarine environments for part of the juvenile phase. If most of the estuaries available to the species are also used for cooling water, then, over the entire geographical range, extremely large entrainment and impingement losses may occur. Henderson (available from www.powerstationeffects.co.uk and attached to this document) in a paper entitled 'Are coastal power stations affecting Northern European inshore fish populations?' undertook one of the few studies that attempted to assess total power station impact over the geographical range of fish. He concluded that in some instances the total impact of cooling water intakes could have an effect of similar magnitude to commercial fishing. As there is no doubt that commercial fishing has brought about great changes to fish populations it would be unwise to accept the view of EPRI.

EPA Response

EPA agrees with the commenter that long term studies (20 years or more) are usually required to detect effects of anthropogenic stressors on fish populations. Detection is difficult given high natural variability, both temporally and spatially, and inadequate survey designs that rarely examine populations before and after impacts (please also see response to comment 316bNFR.507.004). EPA also agrees with the commenter that most aquatic populations are subject to multiple stressors that interact in complex and largely unknown ways, making it difficult to interpret those changes in populations that are detected, or to establish the causes for observed changes. EPA also shares the commenter's concern that wide-ranging populations are often exposed to multiple intakes, resulting in the potential for large cumulative effects that are seldom considered (see responses to comments 316bNFR.529.026, 316bNFR.501.003, 316bNFR.040.002, and section VI.B.2.c of the preamble).

Finally, EPA agrees with the commenter that commercial fishing has brought about extensive change to aquatic ecosystems, some of which is just becoming apparent to researchers as more long-term data sets are evaluated (see response to comment 316bNFR.501.003 and section VI.B.2.c of the preamble.)

Comment ID 316bNFR.529.201

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

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The definition and importance of density-dependent processes

An agent that changes either or both population natality or mortality acts in a density-dependent manner if the mortality rate increases or the natality rate decreases with the size of the population.

It is a commonly accepted fact that populations of animals and plants are constrained in their fluctuations and often vary about a mean level. While random events such as extreme weather or volcanoes can cause great changes in populations they cannot define the mean level about which the population fluctuates. Density-dependent agents will determine the mean level of the population and are important in determining the limits for population growth and average abundance.

Within the field of fish population biology, density-dependence is also linked to the concept of surplus production (see Section 9). It has long been noted that fish can produce far more eggs and larvae than can possibly survive to adulthood. This raisestwo possibilities. First, a small proportion of the adult population may be capable of producing all the recruits required to maintain the population. Second, if density-dependent mortality occurs during the early stages, a considerable number of young may die without any measurable effect on the number of recruits to the adult (breeding) population. Thus it has been argued that adult fish populations can be harvested at appreciable levels without deleteriously affecting the number of recruits. This is described by a stock-recruitment relationship of which the commonest are the Ricker and Beverton-Holt curves. The presumed existence of such density-dependent relationships is the justification for the sustainability of commercial fishing.

Of particular importance with respect to power stations is the argument that because density-dependent mortality must be operating during the early life stages the destruction of egg, larval and post-larval fish by entrainment in cooling water systems will have a negligible effect on the actual number of recruits. The proponents of this view argue that the vast majority of the animals killed by power station entrainment
would die anyway and their death in the cooling water system frees resources or in some other manner improves conditions for the surviving larvae. The killed individuals are just part of the surplus production inherent in fish reproductive tactics. It should be noted that the lost production is only surplus from the viewpoint of the population modeller, concerned only with the number of adult fish for the entrained
species. These lost individuals would not be considered surplus from the viewpoint of the predators and pathogens that would have fed upon them if they had survived.

While the importance of density-dependent regulation has been well established in some habitats and populations this may not always be the case. Further, density-dependence may not even be essential to ensure long-term persistence of a population. In an important study discussed in Section 5, Shepherd and Cushing (1990) show that fish populations may persist for extended periods under high fishing pressure solely through changes in the variability of recruitment. Their model populations produced time series with features remarkably similar to those observed in exploited populations.

EPA Response

EPA acknowledges that one of the arguments made by industry is that a reduction in abundances of early life stages of fish generally will not cause a proportional reduction in age-1 fish because density-dependent compensation ameliorates the effects of early life stage mortality. However, EPA notes that this conclusion depends on a number of assumptions that often cannot be evaluated with available data. In fact, it is generally considered impossible to test for the existence of compensation in a fish population without a long time series of data (20 years or more). Even if a compensatory effect is detected, it can be very difficult to establish the timing and magnitude of the compensatory response, information that is necessary to draw conclusions about the relationship between conditional mortality rates and year class strength for any particular population. For example, even if compensation occurs, the conclusion that an entrainment conditional mortality rate does not represent a reduction in age-1 fish will only hold if compensatory processes occur after the period of entrainment. Finally, EPA wishes to note that even in cases where strong compensation is demonstrated, the magnitude of the conditional mortality rate still indicates the extent to which the plant is reducing the compensatory reserve of the population and thus placing the population at risk. Please see response to comment 316bNFR.068.015 and section VI.B.2.c of the preamble for additional discussion of compensation.

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Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name David K. Gordon & Reed W. Super
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Evidence that fish and crustacean populations fluctuate around a mean or equilibrium density

Assuming, for the present, that a population is closed to emigration or immigration, the size of the population is determined by the balance between natality and mortality and no population stops either increasing or decreasing unless the birth or death rate or both is density-dependent. Thus if populations in the natural world show fluctuations around a mean or equilibrium value then density-dependence must, at least occasionally, be acting. However, both density-dependent and density-independent agents can determine the equilibrium density.

These two conclusions encompass much of the conflict within the debate about the impact of power station impingement and entrainment of fish. The power station operators and their scientists emphasise the logical necessity for density-dependence and how it can mitigate the observed mortalities. The objectors note that increased mortality of a non-density-dependent type such as that produced by a power station reduces equilibrium population size even when density-dependence is operating.

A key aspect of the argument in favour of the widespread, if not ubiquitous, existence of density-dependent control is the belief that populations move around some mean level or at least de-accelerate as they approach some upper carrying capacity. The Severn estuary data set, which includes monthly counts of the abundance of about 80 species of fish and 20 macrocrustaceans for over 20 years is one of the most complete data sets for estuarine and inshore marine life in existence. It offers an ideal source of data to consider whether fluctuation about a mean truly is the norm.

Some of the species in the Severn Estuary fluctuate around a long-term, markedly constant, mean. For example, Fig 1 shows the monthly catch and 12 month moving average for the abundant common shrimp Crangon crangon. This species is the most abundant large crustacean in the system and is a key player in the ecosystem as it feeds on small benthic organisms and is a highly important food for predatory fish.
The moving average removes the regular seasonal change in abundance and clearly shows that average population abundance has remained remarkably stable over a 20-year period. Fish populations are generally less stable in estuaries because the populations usually comprise the younger age classes but, as is shown for the two common species whiting and flounder (Figs 2 & 3), fish populations are also observed to be fluctuating around reasonably constant levels. These examples lend support to the view that density-dependent control is operating.

However, within the same data set are a number of examples of organisms whose abundance displays a long-term trend. Figs 4, 5 & 6 shows three examples of common animals which all show an increasing trend in population abundance. In each case the trend in log abundance is approximately linear through time suggesting an exponential increase in population number. Such a long-term increase in abundance of
common species would not be expected if strong density-dependent controls were operating. For these

species we can conclude that the populations have for many years been below their carrying capacity, or alternatively, recent changes to the ecosystem have greatly increased the carrying capacity. The same data set can also supply examples of populations showing long-term decreasing trends.

Two particularly clear examples of declining trends are shown by the eel, Anguilla anguilla, and the common sea snail, Liparis liparis, (Figs 7 & 8). The dynamics of these species are worth considering in detail because they display features that are not taken into account by workers who apply density-dependent arguments without careful consideration of the underlying ecology of the species.

Eel have shown a dramatic decline in abundance in the Bristol Channel (Fig. 7), a feature that has also been observed over a wide geographical area. The reasons for the decline are obscure, but the most likely cause is decreased survival to adulthood caused by increased mortality during the freshwater phase of the life cycle, linked to water intakes, pumps, weirs and dams and habitat destruction. Additionally, in Europe the introduction of Asiatic eels allowed a lethal parasite to enter the population. Before human interference it is likely that in both European and North America migratory eel were highly abundant and the factors that controlled the populations are unknown. Because the life cycle is extended over a long period of time and encompasses a wide range of habitats from ponds and headwater streams to deep
Atlantic waters it is impossible to identify the key stages in the life cycle where density-dependence could operate. As the estuaries and freshwaters used by this species vary greatly in size, productivity and ecology it is likely that different parts of the population experience different constraints. Thus the number of new recruits observed each year, which is the abundance pattern observed in the Bristol Channel
(Fig 7), reflects some sort of average of events in many places over many years. This requires analysis at the metapopulation level with time lags. This is a situation which standard density-dependent theory is not designed to address but may relate to the type of stochastic model studied by Shepherd and Cushing (1990) (see Section 5). However, it is clear that recent changes have exceeded any density-dependent
compensation available to the population. Given the potentially considerable time lag between birth and reproduction that may exceed 20 years, recent observations may reflect damage to the populations during the 1950s, 1960s and 1970s.

The common sea snail is a small fish that within the Bristol Channel probably only lives for one year. The Bristol Channel is close to the southwestern extremity of its range and Henderson and Holmes (1990) and Henderson and Seaby (1999) showed that the size of the population in Bridgwater bay was linked to temperature. In cooler winters abundance was higher. Henderson and Seaby (1999) concluded that the declining trend in abundance was linked to changes in distribution and did not reflect changes in population size. Thus the population of this species is not fixed in space and may experience different ecological conditions and constraints through time. Indeed, some fish species may exist as a number of semi-isolated populations that may all be moving their locations. Standard density-dependent ideas do not address the temporal variation in constraints that population mobility may produce. Population movements have been documented for highly abundant fish over large geographical areas and are particularly well documented for pelagic ocean species. For example, the Pacific anchovy population is distributed with respect to areas of up-welling and the mixing zones between different water bodies. As the locality and size of these zones can vary the anchovy move the centre of their population. Similarly

large-scale geographical movements of pilchard in western European waters have been recorded over hundreds of years.

Evidently not all species within a community are constrained to fluctuate around a constant mean level. The important point to note from the above observations is that, within a single community, there are populations that are displaying properties indicative of density-dependent and density-independent growth. Further, for many marine and estuarine species the inshore and estuarine zone is used as a nursery and the young recruits may derive from adults that were reared in other regions. Thus a large-scale meta-population approach may be required if appropriate population models are to be produced.

EPA Response

EPA agrees with the commenter that biological populations are controlled by both density-dependent and density-independent factors and that the relative importance of these factors for any particular population can be difficult to determine (see also responses to comments 316bNFR.529.108, 316bNFR.507.004, 316bNFR.068.015, 316bNFR.040.002, and section VI.B.2.c of the preamble for further discussion of population modeling and compensation).

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Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name David K. Gordon & Reed W. Super
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Evidence for density-dependence in fish populations

Competition in restricted habitats

The best evidence for density-dependent regulation in fish populations comes from numerous studies of freshwater salmonid populations in streams and small rivers. Perhaps one of the best examples is that presented by Elliot (1989) for a population of brown trout (Salmo trutta). In one small stream the stock-recruitment relationship clearly conformed to a Ricker curve and regulation was mostly via density-dependent survival during early life stages. However, in another nearby stream, which offered poorer conditions for trout, there was no evidence of density-dependent control and the population was constrained by variation in physical conditions. Often both climatic and competitive effects are working to determine the populations of these species. For example Latterell, Fausch et al. (1998) studied fall-spawning brook trout (Salvelinus fontinalis) and brown trout (Salmo trutta) in six small Colorado streams.
Periods of high snowmelt runoff reduced trout recruitment by displacing the fry, however population regulation was via density-dependent mortality caused by adult trout in combination with high flows. Constraints and competition on spawning grounds in salmonids have been widely reported. In waters where good spawning substrates are scarce, fish may disturb or destroy previously formed redds. Salmonid spawning dynamics is an area of continuing interest and research (e.g. Maunder, 1997).

Growth

A change in the rate of growth of fish can have an appreciable effect on the dynamics of the population because mortality and age-specific fecundity are often size-dependent. There are many examples showing a relationship between growth and abundance, particularly in restricted habitats such as ponds or reservoirs. There are also many cases of variation in growth that are linked to physical factors such as
temperature, water depth, oxygen and stratification. Often biotic interactions such as competition only occur under certain physical conditions where space or some resource becomes limiting. Shin and Rohet (1998), who note the negative relationship between growth and abundance for North Sea Herring (Clupea harengus), give an example of such interactions in a marine habitat. As with most such examples there is also a climatic effect, as wind-induced turbulence may delay spring plankton blooms by reducing water column stratification and thus reducing the food supply. However, these observations are unlikely to constitute a clear case of intra-specific competition acting to regulate the population as over-fishing has reduced the North Sea herring stock well below historical levels. There can be little doubt that a number of over-exploited marine fish populations have responded to reduction in population number
by growing faster and maturing at an earlier age. Changes in natality caused by variation in growth may be the normal compensatory mechanism in some marine fish populations. Such weak and relatively slow to act compensation is very different from the density-dependent mortality during the early life stages assumed by those who argue that power stations are having no effect.

Winter kills have often been observed to greatly reduce fish populations allowing enhanced growth and reproduction of the survivors. For example, Sammons, Bettoli et al. (1998) in a study of threadfin shad, Dorosoma petenense, and gizzard shad, D. cepedianum in a reservoir in Tennessee, found that the production of larvae was regulated by adult abundance. When size-selective winter kills reduced stocks,
surviving shad responded to the reduced competition for food in early spring and increased condition enough to spawn successfully. Similarly, Kohler & Ney (1981) reported increased growth of alewife, attributed to reduced competition for zooplankton, following a massive die-off in a Virginia reservoir.

Density-dependent mortality

Density-dependent mortality has rarely been observed in adult fish populations except in isolated and confined localities such as competition for nesting sites or shelter. There are four main mechanisms by which density-dependent mortality may occur: 1) resource competition leading to starvation, 2) exclusion from protected habitat leading to predation, 3) cannibalism and 4) increased disease transmission at high population levels. In the case of all four of these mechanisms larval and juvenile fish are considerably more vulnerable. Mature fish are able to survive longer periods without food, are less vulnerable to predators and cannibalism, and have a far more robust immune response.

Resource competition leading to starvation of young fish has frequently been hypothesised but has been almost impossible to prove. While many species produce very large numbers of larvae they are often widely dispersed prior to the commencement of feeding. Many of the examples of density-dependent mortality during the early life stages are for restricted habitats such as streams (e.g. Elliott, 1989 for brown trout).

Exclusion from protected habitats is almost certainly an important feature for some small stream fish. For example, Faush & White (1981) demonstrated that the removal of brown trout from a Michigan stream allowed brook trout to occupy more favourable resting sites and thus reduce their predation losses.

Cannibalism certainly occurs in fish and may on occasion result in density-dependent mortality. Ricker (1954) notes that it is difficult to assess its importance and there have been few studies that have cannibalism as an important regulatory agent. There are many recorded instances of cannibalism in fish. For example, Letourneur, Chabanet et al. (1998) in a study of grouper settlement on a reef concluded that predation by reef fish, including cannibalism, is probably responsible for the high mortality of recruits. Henderson (1997) argued that cannibalism by 2 and 3 year old bass (Dicentrarchus labrax) could influence the survival of new recruits to the nursery. However, this population was also strongly influenced by seawater temperature, producing occasional good years of recruitment in warm years.
Cannibalism was thus only important if two or more warm years occurred in succession. Cannibalism may introduce a density-dependent lag in the system and thus may not be a stabilising mechanism.

Disease is known to be an important control on terrestrial populations, but is under-reported for fish populations. At present we know almost nothing about the role of disease in the regulation of fish populations.

Examples of marine or estuarine fish populations existing close to carrying capacity are rare and possibly only known from situations where considerable reduction in the carrying capacity has occurred over the period of study. Kimmerer, Cowan et al. (2000) studied possible density-dependent effects on striped bass (Morone saxatilis) in the San Francisco Estuary. Density-dependent mortality between 1 month of age and 8-12 months caused by food limitation after metamorphosis was observed. The food resources observed in the estuary declined over the study period and the authors suggest that the decline in striped bass over the last two to three decades may be partly due to declining carrying capacity.

The above selective examples show that there is a clear body of evidence in favour of the existence of density-dependent control in fish populations. However, most of the best examples come from populations in small, restricted habitats. While this may be related to the ability of researchers to adequately estimate population size there must be some doubt as to the existence of such powerful regulatory responses in larger, less restrictive habitats and in less favourable localities. Within these localities density-independent factors may dominate.

EPA Response

EPA agrees with the commenter that density-dependence is most likely to be detected in populations in small, restricted habitats. Wide-ranging populations are more difficult to define and are more likely to experience highly variable physical conditions that can overwhelm potential density-dependent processes (see also response to comment 316bNFR.523.103 and section VI.B.2.c of the preamble).

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Regulation without density-dependence

Shepherd and Cushing (1990) noted that marine fish stocks often vary through time by one or two orders of magnitude for reasons that have been difficult to identify. While it is certain that climatic variability is playing a part in these changes, the role of population regulatory mechanisms has been difficult to identify. While the high level of variability suggests only weak regulation, the ability of fish populations to persist under quite intense fishing and other anthropogenic mortality effects suggests strong compensation. They point out that analysis of stock-recruitment diagrams has rarely yielded clear evidence for density-dependence and suggest that this may be because it does not exist. They present a model in which there is a weak density-dependent response, which may not be operating at low densities, plus a stochastic element which increases recruitment variability as the population declines. They were able to show that this model could maintain the population over surprisingly long time scales because at low population densities the mean population size becomes increasingly larger than the median. This is because of the generation of infrequent, very large year classes. As they note, the occasional production of very large age classes is a frequent feature of over-exploited fish populations and suggests that stochastic processes may regulate such populations.

A variety of mechanisms by which variability might increase as population size decreases can be envisaged. One particularly feasible possibility is linked to the patchiness of the habitat in either space or time. If the habitat is divided into patches that can support different population sizes then the total population is given by the sum of these various sub-populations. As the total population declines the number of sub-populations will decline resulting in increased variability. Such arguments suggest that metapopulation models should be considered.

The effects of environmental variability on density-dependent regulation The powerful role of environmental variability can be demonstrated using a simple model that assumes that density-dependence can occur. It will demonstrate that a population that would be under density-dependent control in a stable environment is normally controlled by density independent factors when the environment is variable. It will show that, if the environmental variation is sufficient, the population will spend large periods of time at population levels below that at which density-dependence would come into play. This situation may indeed be the case for common marine and estuarine fish where the population is living in less favoured habitats such as those close to the edge of the range for the species. To give the model relevance and demonstrate that it is not based on abstract and unrealistic parameters, it is based on the life history of the Atlantic tomcod , a common species in American East coast estuaries that is vulnerable to power station cooling water entrainment and is known to be killed in large numbers.

The Atlantic tomcod in the Hudson River usually only lives for one year. The eggs are produced during the winter in January and the fish are mature by the following December. Summer Temperatures are sub-optimal for the species and little growth occurs from late July to early September. The duration of the summer period over which negligible growth occurs varies between

years. This simple life-cycle can be
used to build a mathematical model that illustrates important features of density-dependent control and the influence of none density dependent factors such as summer temperature.

The basic features of the model are as follows.

1. The eggs produced by an individual (Fecundity) is related to the size of the fish by the equation :

$F = aL^b$

where a = 0.0021, b = 3.0488 and L is the total length of the female in mm. These parameters were obtained by fitting a power curve to published fecundity data.

2. Survival from the egg to adult, S, is a single non-density-dependent parameter that can be varied. Typical values are in the range 0.00008 to 0.000065 and are derived from published data. So that the number of adults, N, is calculated as E.S where E is the number of eggs.

3. Above a critical density at which competition or interference occurs, the growth of the fish is density-dependent. To produce numbers of appropriate magnitude for the Hudson River density dependence was assumed above a population of 10^9 eggs. In the absence of density-dependent effects and summer growth inhibition the average total length of the females would be 200 mm. Above a population of 10^9 eggs growth declines linearly with population size so that a population of 10^{10} eggs would produce an adult population with an average total length of 150 mm.

4. The duration of the summer period without growth, D, is a random variable generated from a Gaussian distribution with specified mean and standard deviation. Typical values would be 40 and 15 respectively. For each day without growth, the length of the adults prior to spawning is reduced by 0.5 mm. The actual size attained, La, by the adults is given by the equation:

$La = Ldd - 0.5D$

where the length that would be achieved under density-dependence, but without the loss of summer growth is Ldd.

If there is no period of zero growth during the summer the model reduces to a simple deterministic model of density-dependence and the population size grows from a small number until it attains an equilibrium size as shown in Fig 9. For example, with S = 0.000065 the mean adult length is a constant 178.5 mm which in turn results in a constant egg production and number of recruits.

If the environment is made variable by randomly selecting the duration of the summer period without growth then a completely different type of population dynamics is produced. For example, Fig 10 shows the simulated population size over 1000generations assuming a mean number of days with zero growth of 40 with a standard deviation of 15. As with the constant environment the population initially rises, but is unable to stabilise as growth and recruitment varies between years. The most notable feature of the population in the variable environment is that the population size spends the great majority of its time at population sizes too small for density-dependent growth to operate. While

density-dependence is defining an upper ceiling below which the population fluctuates and stops the population from drifting forever upwards it is not controlling the actual numbers present.

This model demonstrates how density-dependence and independence can interact with some important consequences. A key feature of this model is that the mean population number is highly sensitive to changes in the survival parameter, S because density-dependent factors are not determining the mean level. Thus additional mortality, such as power station entrainment of the larvae as occurs with tomcod in the Hudson, could have a considerable influence on the number of adults present in the population.

EPA Response

EPA agrees with the commenter that the dynamic features of marine fish populations can be reproduced by models based on stochastic variation and weak density dependence as well as models that assume a strong density-dependent, stock-recruitment relationship. That is why the predictions of population models cannot be considered proof of the existence of density dependence. EPA believes that the existence of density dependence must be demonstrated unambiguously with empirical population data before including such an assumption in a model constructed to predict future population dynamics (see responses to comments 316bNFR.529.202 and 316bNFR.529.206.)

After further review, EPA has elected not to use the population modeling approach in this new facility rule. Instead, today's final rule establishes technology-based performance requirements, based on a two-track approach, that reflect the best technology available for minimizing adverse environmental impact of a cooling water intake structure. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit applicant to select and implement design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish. These design and construction technologies may be modified by the permit director in subsequent permits if the original design and construction technologies do not meet the applicable requirements in § 125.84 of today's rule, or if such modifications are necessary because of the effects of multiple intakes on the same water body, seasonal variations in the aquatic environment, or the presence of regional important, threatened, or endangered species. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I. Track II also requires the applicant to meet the same proportional flow requirements that apply in Track I.

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Organization Riverkeeper

Density-dependence within a metapopulation context

The available observational data of fish populations in estuaries suggests that while some species display dynamics indicating a tendency to return to a long-term mean size others show long-term trends in abundance (see Section 3 for examples). Others show large responses to climatic variables such as temperature (eg bass, Henderson & Corps, 1997; sole and dab, Henderson and Seaby, 1994 and sea snail, Henderson and Seaby, 1999). Populations showing large responses to climatic variation or long-term trend are unlikely to be under strong density-dependent control. However, there must still be potential constraints upon their population size. One explanation for their dynamic behaviour could be that there has been a large recent change in carrying capacity and the populations are responding by growing or shrinking, however this seems unlikely. The more probable explanation is that some of the species in any particular locality are not well adapted to the range of potential conditions and thus cannot maintain their population in the long-term. For these species, the habitat is marginal and migrants from regions where conditions are optimal ensure long-term survival of the population. Occasionally, conditions may become suitable in which case migrants rapidly establish a population while at other times poor conditions result in local extinction. Thus to understand the observed dynamics we need a meta-population model in which different regions hold populations that display different dynamic behaviour. These are often termed source and sink populations. A general meta-population scheme can be represented as follows:

[see original for figure]

EPA Response

EPA is not using populations as the endpoint for measuring performance in this rule. Nevertheless, EPA agrees with the commenter that wide-ranging fish populations that experience significant emigration and immigration in response to highly variable physical conditions are probably best modeled using a metapopulation approach.

Comment ID 316bNFR.529.206

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Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

Development of density-dependence arguments for mitigation of impingement and entrainment

From the 1940s there was a steady development of increasingly larger direct-cooled power plant complexes situated on large rivers, lakes, estuaries and coasts. By the 1960s, large volumes of water were being extracted from some localities such as the Hudson River estuary near New York, and demand was still rising. It soon became clear that cooling water intakes were killing large numbers of fish by entrainment and impingement. The problem was to assess the scale of the impact on the ecology of the
waters. The use of density-dependent models to argue that the observed mortalities were insignificant, at least in terms of the adult populations of the most impacted species, was a key feature of the Hudson River power plant environmental impact studies from the mid 1960s. During the U.S. Atomic Energy Commission hearings relating to unit 2 at Indian Point in 1972, the consultants for the utility presented
models using compensatory functions to argue that entrainment and impingement losses would not result in large losses to the adult fish populations. Particular attention was focused on the striped bass although attempts were also made to apply compensatory models to other species such as Atlantic tomcod and white perch. Considerable doubt was expressed over the validity of these models which, as I will explain below, can with hindsight be seen as well founded. However, with the collection of considerably more data on the populations of striped bass, white perch, Atlantic tomcod, American Shad and other species, refined techniques to fit compensatory models been developed and used in 1999 in the DEIS for the licence renewal at Bowline, Indian Point and Lovett power stations. The development of compensatory arguments for the Hudson power plants represents the main testing ground for such ideas and the decisions reached as to the validity of these arguments will have far reaching effects throughout the world. They will therefore be the main focus of this section.

Before discussing the compensatory models developed in the USA it is worth noting that research in Europe resulted in adoption of a different approach. From about 1980 the Central Electricity Research Laboratories in England undertook development work on the application of density-dependent models for cooling water intake impacts. Early on it was concluded that density-dependent models were inappropriate. However, the European power industries were still keen to develop arguments that would mitigate the reports of extremely large fish mortalities at direct-cooled power stations. As in the USA the vast majority of the fish killed were in the early stages of life and the approach that was developed was to calculate the ‘Adult Equivalent’ of the loss. Essentially, the estimated number of young killed was multiplied by the calculated survival that would be expected under natural conditions until adulthood or
the age when they would be large enough to enter the commercial fishery. The resulting estimate was used to compare the loss of adults caused by the power station to both the estimated size of the adult population and the adult mortality due to commercial fishing. The method could only be applied to important commercial fish for which large amounts of demographic data were available. This approach was used extensively in the Environmental Statement for Sizewell B nuclear power station in the early 1990s and has been a standard approach since. More recently it was used in the application

for the proposed Bowline 3 on the Hudson Estuary.

Adult equivalent arguments tend to be particularly attractive to utilities when the total number of young fish killed is not particularly large. The basic argument is that if only 1 in a thousand young fish will survive to adulthood, then if 20,000 per year are killed this is only equivalent to 20 adults. This argument seems persuasive but holds a hidden fallacy, for it does not consider what contribution the 19,980 individuals that are doomed to die might have made to the local ecology during their life and death (see Section 9).

Density-dependent models were first applied and subjected to intense open debate during investigations into the long-term effects of power stations on the Hudson Estuary. The contractors working for the utilities attempted to demonstrate that impingement and entrainment loss at a series of direct-cooled power plants would not reduce the populations of striped bass and other common species. The approach taken was to assume that the stock-recruitment relationship could be described by a Ricker
or Beverton-Holt curve and the impact could be measured by the theoretical reduction in the equilibrium population size. The Ricker stock-recruitment relationship is described by the equation:

R = a P exp(- "B"P)

where P is the size of the spawning population, a and "B" are fitted parameters that reflect both density-dependent and independent recruitment, and R the number of recruits produced.

The equilibrium population size for this model occurs when

P = R = In a / "B"

If such a population is subjected to additional mortality caused by power stations, which acts after the period in the life cycle when density-dependence acts, then the new equilibrium population size PE is given by

Pe = Re = In [a (1 - m)] / "B"

The impact of the power plants can then be expressed as the percentage change, PC in equilibrium abundance

PC = Pe - Pr / Pr .100

which has the useful property that "B" cancels out so that

PC = In(1 - m) / In "a"

If this model is appropriate, then given estimates of m and a , the effect on the equilibrium population size can be assessed. Similar equations could also be constructed for the Beverton-Holt stock-recruitment relationship.

There are major problems associated with this approach, first on fundamental biological grounds and secondly because of the difficulties of estimating a . The model was applied to striped bass and as noted by Savidge, Gladden et al. (1988), key assumptions were: 1) the relevance of the Ricker or Beverton-Holt formulation; 2) the applicability of a deterministic model to populations in a highly variable environment; 3) the application of the Ricker curve which was developed for semilparous (single spawning) salmon to an iteroparous (multiple spawning) species; 4) assumptions on the timing of compensation relative to the impact of entrainment and impingement within the life cycle and 5) the consistency of the environment and other impacts upon the species. None of these assumptions could be justified for the species studied in the Hudson Estuary. Furthermore, Christensen and Goodyear (1988) concluded from a study of simulated data sets that was impossible to reliably estimate the value of a by curve fitting.

It is now clear that these early density-dependent models were incorrect and their many critics have been justified. This is particularly the case for the striped bass for which during the 1970s there was insufficient population data available to attempt an analysis for density-dependence. The only available data was from fishing yields expressed as catch-per-unit-effort (CPUE) of adult fish returning to spawn. The initial
approach taken was to plot the CPUE against itself with a lag of 5 years with the assumption that the parents in year 1 create the offspring observed in year 5. We can be sure that these density-dependent arguments were incorrect by considering how the populations have changed since the 1970s. Fig 11 shows plots of post larval and adult striped bass abundance indices. Both these time series suggest that between the 1970s and the late 1990s striped bass abundance in the Hudson estuary increased 10- to 30- fold. An increase that could not have occurred if the population during the 1970s was under the degree of density-dependent control claimed at the time. Similar criticisms can be applied to attempts to model density-dependence in Atlantic tomcod. In this case there is recent evidence that the population is in decline, a result that is contrary to the modelling predictions.

The recognition that density-dependence could be a key argument in the justification of entrainment losses resulted in 1981 in the Electric Power Research Institute (EPRI) initiating a research program to identify and measure compensatory mechanisms in fish populations. In 1987 EPRI initiated the CompMech program. This is based on the creation of simulation models for growth, reproduction and survival of individual fish. In the individual-based modelling approach explicit details are given on the ways that individuals differ in their traits and how they respond to the environment. Thus the model holds details of each individual in the population and simulates through time the fate of each fish (van Winkle, Rose et al., 1993). One of the most developed of these models is for the winter flounder, Pleuronectes americanus which was developed using long-term monitoring data from the Millstone Nuclear Power
Station, CT (Chambers, Rose et al., 1995). This model was used in the submission for renewing the power station's NPDES permit and formed part of an argument that density-dependent compensation was sufficient so that little benefit would be gained if alternatives that reduced water extraction were fitted. While individual-based models have been used to study fishing, changes to flow and habitat alteration this appears to be the only case where they have been applied to the assessment of entrainment losses.

As Chambers, Rose et al.(1995) discuss, individual-based models are particularly effective for the study of the interactions of a variety of factors that may in combination determine recruitment.

However, they are only possible when considerable information is available on the habitat and the growth and mortality of the fish. Essentially, all the important potential interactions must be identified and described mathematically. Further, they are unable to cope with the subtleties of community dynamics such as species interactions that may have a spatial element. For these reasons this type of modelling is unlikely to be widely used for assessing entrainment and impingement.

Following the Hudson River settlement, information on the populations of many of the common fish, and particularly striped bass, have been collected so that for many life stages a 20 to 25 year time series now exists. In 1992 the utilities applied to renew the SPDES permits for a number of Hudson estuary power plants and presented a Draft Environmental Impact Statement (DEIS) that used the greatly increased body of knowledge to develop new density-dependent models in mitigation of power plant entrainment losses. As in the 1970s the greatest effort was directed at the striped bass model. The modelling approach taken by Ray Hilborn was a radical departure from that taken earlier (see Draft Environmental Impact Statement for the State Pollutant Discharge Elimination System Permit Renewal for Bowline Point 1 & 2 Indian Point 2 & 3 and Roseton 1 & 2 Steam Generating Stations Appendix VI-4, “Impacts of power plant mortality on Hudson River striped bass”).

The model proposed is age-structured with a Beverton-Holt stock-recruitment relationship used to predict the young-of-year population. No reason is given for the choice of the Beverton-Holt curve, as opposed to other possible functions that could describe this relationship. Natural mortality rates and fecundity at age are held constant. As before, the task is to estimate reliable parameters for the stock-recruitment relationship. This is undertaken within an Excel spreadsheet. The basic approach taken was to use the available time series of abundance indices to find the parameter values for the Beverton-Holt model that gave the best fit using the maximum likelihood method. A Baysian probability argument was used to discriminate between different possible combinations of model parameters.

The various time series available representing indices of abundance are given quantitative scores to reflect their reliability and these are used to estimate the variances associated with each index. Density-dependence is only assumed to operate between the post-yolk-sac and young-of-year developmental stages. No density-dependent processes either earlier or later in life are considered. This is a critical
assumption, as density-dependence at a pre post-yolk-sac stage would increase the significance of the large number of post-yolk-sac larvae killed by entrainment. The model does not take into account the effects of environmental variables such as river flow and temperature on recruitment, survival and spawning. All environmental signals are treated as noise terms.

It was concluded that appreciable levels of density-dependent mortality were operating between the post-yolk sac and juvenile life stages. While this modelling approach would seem to give an objective method with which to create the best model, it is important to note that it is only able to discriminate between different parameter values for the specified model. If this model is unsuitable or the indices do not reflect actual abundance then spurious conclusions will be reached. As in the 1970s no biological basis or direct observational evidence in favour of the stock-recruitment relationship was given.

The model makes strong a priori assumptions that density-dependence will be operating during the first year of life. While it is argued that the steepness parameter (h) can take a value which implies that

there is no density dependence (h = 0.2), it is worth noting that it is possible to give this model random time series and still obtain parameter values that suggest strong density dependence. In fact, if the model is
given independently-generated random series for the post-yolk sac larvae (PYSL) and young-of-year (YOY) time series this will be interpreted as evidence for very strong density-dependence. The key point is that any measurement errors that reduce the correlation between the PYSL and YOY abundance will be interpreted as evidence for density-dependence.

The modelling exercise concludes that there is an exceptionally powerful density-dependent control on recruitment. This is an inevitable consequence of the fact that post-yolk sac larval index (PYSL) shows a recent rising trend which is not shown in the young-of-year (YOY) surveys. It should be noted that the fitting of a density-dependent model by the Baysian approach taken does not constitute either statistical
proof or convincing evidence that density-dependence is operating within the population. This is because a lack of relationship between these variables will be interpreted as evidence for density-dependence. In the case of striped bass in the Hudson it is quite possible that YOY surveys are not reflecting the recent rise in the population. It is likely that YOY bass have increased their distribution since about1989. The reduced discharge of untreated wastewater from Manhattan Island and increased oxygen levels may be linked to the movement of YOY fish into East River and western Long Island Sound.

The Baysian model fitting approach developed during the 1990s for the Hudson River studies represents the most sophisticated approach yet developed for the estimation of density-dependent parameters. However, it should only be applied following an analysis that supports the existence of density-dependent changes in demographic parameters. Used indiscriminately, the method will find density-dependence where none exists. In the following section a protocol for the identification of density-dependence is discussed.

Studies on striped bass in the San Francisco estuary have indicated that density-dependent mortality occurs between 1 and 12 months of age and that the relationship between the abundance of young of year and age 3 fish fits a Beverton-Holt function ((Kimmerer, Cowan et al. 2000). This is suggested to be because of food limitation. The asymptote of the Beverton-Holt curve has declined over the period of study suggesting a reduction in carrying capacity possibly because of a decline in food availability. This study is interesting in that it demonstrates that density-dependence will be observed in a population declining as resources decline. Under such conditions it is not a stabilising or compensatory mechanism, but rather the means by which the population size is reduced to sustainable levels.

EPA Response

The commenter provides results from a number of different modeling exercises that illustrate that the dynamic features of marine fish populations can be reproduced by models based on stochastic variation and weak density dependence as well as models that assume a strong density-dependent stock-recruitment relationship. Therefore, EPA concurs that the existence of density-dependence should be demonstrated in a given population of concern before constructing a model to predict future dynamics. Finally, in the case of the Hudson River striped bass, EPA notes that the commenter's

interpretation of recent population trends has merit. The commenter proposes that data used as support for density-dependent compensation in this population may instead reflect changes in the distribution of striped bass in response to water quality improvements that may be linked to the movement of young-of-year (YOY) fish into the East River and western Long Island Sound. Such a change in the distribution of YOY could help account for the lack of an increasing trend in YOY surveys that is commensurate with the increasing trend shown in the post-yolk sac larval index, which otherwise has been interpreted as evidence of strong density-dependence.

A protocol for proving the existence of density-dependence

It is clear from the arguments presented above that it cannot be assumed that all fish populations will be under density-dependent control and a compensatory argument to justify impingement/entrainment losses must be based on clear proof that density-dependence is operating. Further, fish almost always pass through a number of free living developmental stages, each of which requires and uses different habitats and resources. Thus it can be anticipated that a whole series of resources can be potentially limiting. This is an important feature and all of the life stages of a species must be considered if the key factors controlling abundance are to be recognised. The fitting of Ricker or Beverton-Holt stock recruitment curve with an argument as to the significance of the fit cannot be used as evidence for the existence of density-dependent processes. This approach is based on the a priori assumption of the existence of a particular stock-recruitment relationship that will be apparent over the range of densities observed. Below is presented a staged protocol that if followed would constitute reasonable proof for or against density-dependent regulation.

1. The spatial extent of the population and the degree of isolation of the particular population under study must be considered. Particular attention needs to be focused on temporal variation in the spatial distribution. Fish can rapidly change or extend their distribution in response to climatic change, changes in ocean currents and the size of the population. Fish at all stages are often highly aggregated and patchy in their distribution. If a population in decline is continually receiving recruits from other more vigorous populations and this is not recognised then density-dependent regulation may be wrongly assumed to be stabilising the population. In general, density-dependent arguments cannot be applied to very wide ranging species with complex, extended life cycles such as the American and Europeans eels (Anguilla spp).

2. The habitat requirements of the fish over the whole life cycle must be known. This must include a) knowledge of the spawning, larval, juvenile nursery and adult living and feeding areas and b) major migratory pathways and seasonal changes in distribution.

3. Because animals are particularly vulnerable during periods of morphological, behavioural and habitat change, the periods in the life cycle when these changes occur and their locality in space and time must be identified. The environmental factors such as flow, temperature, salinity and storms that alter survival over the vulnerable periods of life should be identified.

4. Using information from 1-3 above an assessment should be made of the likely pinch points or bottlenecks in the life cycle. Examples of a bottleneck for an anadromous species that feeds over a wide area of ocean as an adult may be the limited riverine spawning area. Similarly young, recently metamorphosed, flatfish often settle on inter-tidal flats, a potentially constraining habitat in comparison with the large subtidal areas used by the older juveniles and adults and the vast areas of open sea available to the larvae. The survival and hunting efficiency of almost all animals increases with experience and thus a potential pinch point may be a major change of habitat or feeding behaviour. A

well known pinch point for many temperate fish is survival over their first winter when young which had insufficient time or food to lay down fat reserves starve.

5. Recent habitat changes must be identified. Commercial fishing, dams, pollution, habitat loss or gain and many other anthropogenic changes are common, particularly in estuaries. These can have a major impact on fish populations and if not recognised result in a misinterpretation of population abundance data. It is important to obtain all available information on the historical size of the population. A population that has been greatly reduced below its historical level by over-fishing almost certainly cannot be experiencing any significant level of density-dependent mortality or growth. Those seeking to mitigate power station losses have often ignored this obvious feature.

6. Time series of the abundance of the fish need to be collected. Ideally, time series need to be available for a number of life stages with particular emphasis on abundance before and after key developmental stages and presumed population pinch points and bottlenecks. Most fish population time series are indices of abundance and different methods are used to sample different life stages. Where possible these indices should be calibrated to give absolute population estimates. The chances of demonstrating the existence of density-dependence are highly dependent on the length of the time series available, and there is little prospect of success without at least 10 years of data and probably greater then 20 will be required.

7. Given abundance time series for a number of developmental stages e.g. egg, larval, post larval and juvenile, key factor analysis should be undertaken to identify the stage(s) at which mortality determines the overall temporal pattern of recruitment. Without some form of key factor analysis, the assertion that power plant mortality mainly occurs prior to the period of density-dependent mortality is merely supposition.

8. It is often the case that a sufficiently long or reliable time series only exists for one stage in the life cycle and thus key factor analysis is impossible. A number of approaches have been developed for the detection of density dependence in long time series (Rothery, 1998). The underlying approach is to test the null hypothesis that the data can be produced by a random walk with or without drift. If there is no trend in the time series then Bulmer's test (Bulmer, 1975) can be applied. Where, as is generally the case for fish, the data follow a trend then a randomization or bootstrap test (Pollard et al. 1987; Dennis & Taper, 1994) should be applied. Simulation studies have been performed to compare the relative performance of these tests (Rothery, 1998; Shenk, White et al., 1998). The ability to detect density-dependence increases with the length of the time series and in some cases time series of 100 years or more may be required. Density-dependence can be detected in short time series if Gompertz or logistic equations offer a good description of the dynamics.

9. In some populations density-dependent changes in population demographics linked to growth resulting in changes in age-specific fecundity or age of maturity may be detectable. However, such changes are often observed in populations during and after serious collapses in abundance (eg Atlantic herring, Baltic cod). They cannot be used as evidence of a compensatory response capable of negating power station losses without supporting evidence that the population has not recently collapsed.

EPA Response

EPA agrees with the commenter that compensation must be demonstrated empirically and not simply based on population modeling to be considered as a factor mitigating intake losses. EPA also agrees with the commenter's list of factors that must be considered to test hypotheses about compensation, including the spatial extent of the population, temporal variation in distribution, habitat conditions that are limiting, anthropogenic stressors, and life stage(s) at which mortality determines recruitment. EPA also recognizes that analysis of such factors requires a long time series of abundance data, which is unavailable for most species that experience impingement and entrainment. The difficulties of demonstrating compensation and the limitations of population modeling are among the reasons why EPA has developed a technology-based rule for new facilities that focuses on minimizing impingement and entrainment to the extent that is economically practical and achievable with available technologies, thereby avoiding debates about population-level impacts that are costly and difficult, if not impossible, to resolve. Please see response to comment 316bNFR.507.004 and section VI.B.2.c of the preamble for additional discussion of population-level studies.

Comment ID 316bNFR.529.208

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

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The concept of surplus production

The identification of population control by density-dependent processes, and thus the possibility that they may compensate for some additional level of mortality, lead to the concept of surplus production. The offspring that are produced by fish but cannot possibly survive to adulthood are considered a surplus and it has been argued that entrainment by power plants is taking from this surplus and thus inflicting no damage on the adult population. J. Boreman (in press) has, by taking an ecosystem approach, shown the fallacy of this argument. "If a surplus is being removed by power plant operations, then something else in the ecosystem is being out-competed." This is an important point that has frequently been lost during studies of density-dependence in fish. The focus of the modeller tends to be the maintenance of adult numbers within the population understudy. No consideration is given to the maintenance of the
predators that normally feed upon the fish if man does not take them. Density-dependent arguments are concerned with the stability and continued existence of a species as mortality and natality changes. They can say nothing about the overall ecological health of a system subjected to increased mortality rates from power plants and other cooling water intakes.

Hidden with the adult equivalent approach to assessment of power station losses there is also a surplus production argument. Just because only a small number of the young will live to adulthood does not mean that these young over their brief lives might not contribute to the maintenance of predators and other organisms that can take advantage of their presence. The weakness of the adult equivalent argument can be easily seen by analogy. A hundred tons of rice might be required to give sufficient energy to take 5 humans from birth to age 70. However, during a famine this quantity of rice might sustain 2000 people for sufficient time to ensure their survival. If the rice store were to burn down, who would equate the loss to 5 human equivalents?

EPA Response

The commenter argues that the concept of surplus production is flawed because in actuality ecosystems do not produce a "surplus." The commenter argues that a power plant that impinges and entrains organisms functions like any other competitor in an ecosystem, and thus once a power plant removes production it is no longer available to other competitors within the food web. EPA concurs that impingement and entrainment losses have consequences for other species that rely on those organisms for food or other support. As a result, single-species population models underestimate intake-related losses of ecosystem production. However, EPA disagrees that the concept of surplus production is inherent in adult equivalent analysis. The purpose of adult equivalent analysis is to express losses of eggs and larvae in units of fish. The analysis is not designed to account for the transfer of these losses to production of predator biomass, although such an analysis can be accomplished using the production foregone model of Rago. Please see responses to comments 316bNFR.507.004, 316bNFR.068.015, and section VI.B.2.c of the preamble for additional discussion

of population models.

Comment ID 316bNFR.529.209

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

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Concluding remarks

There is overwhelming evidence in favour of the existence of compensatory mechanisms in some fish populations. However, for marine and estuarine fish that often live over wide geographical areas and may achieve very large population sizes density-dependent mechanisms have been hard to identify. Attempts by fisheries biologists to use stock-recruitment models for marine and estuarine fish populations have not been successful and are not used for fisheries management. The only field where they have been successful is the modelling of salmonid populations in small streams. Even if these models are appropriate, there are considerable practical difficulties in estimating the density-dependent parameters. Utilities have been attracted to stock-recruitment models to defend the large-scale destruction of young
fish. Early attempts at fitting Ricker and Beverton-Holt curves were unsuccessful. More recently, as far greater amounts of biological information has become available, this approach has been re-applied within a complex modelling system under which the parameters are chosen by maximum likelihood. The weakness of this approach is the underlying assumption that strong density-dependence is acting early in life. There is no fundamental reason why this should be the case, indeed it is possible to produce
models based on stochastic variation and weak density-dependence which display many of the dynamical features of marine fish. It is therefore reasonable to demand that the existence of density-dependence be proven prior to the establishment of a model. This is never done, presumably because it is impossible to demonstrate density-dependence. The fact that a model can reproduce many of the features seen in the original time series cannot constitute proof of the validity of the model.

In recent years there has been progress in the development of individual-based simulation models that hold great promise in helping us to understand the processes that mould populations. These models require explicit descriptions of the possible events that may occur during the life of a fish. Such levels of information are rarely available and have created a void into which models of convenience can be presented as science. The use by consultants of compensatory models without any supporting evidence as to their suitability, based solely on the premise that there must be density-dependence, should stop.

EPA Response

Please see response to comment 316bNFR.529.006.

Comment ID 316bNFR.529.301

Subject Matter Code	9.3
Documentation of I & E Impacts	

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At present there are 45 large, direct-cooled power stations bordering the southern North Sea, English Channel and North East Atlantic coast of Britain and Northern Europe, all of which kill fish while pumping cooling water. It has been assumed, by considering the stations in isolation, that compared with natural and commercial fishing mortality these losses are insignificant. For the first time, an attempt is made to find the sum effect of all these stations. The rate of mortality of fish above 3cm is estimated as 3 to 5 x 10^8 individuals per annum. For eggs, larvae and small fish which pass through the stations the mortality rate is of the order 10^14 individuals per annum; most of which are larval or post-larval fish. For many of the 119 species being killed these losses may be reducing abundance and for some non-commercial species is likely to be the single most important anthropogenic impact upon them. For the Southern North Sea the sum effect of the 17 power stations sited in this region on two important commercial species, sole Solea solea and herring Clupea harengus, may reach the equivalent of 50 % by weight of British commercial landings for the region. If these calculations are correct then mortality by power stations needs to be considered within fisheries models for the North Sea. Present conservation measures for inshore fish such as bass Dicentrarchus labrax and twaite shad Alosa fallax may be ineffective until high cooling water intake mortalities are reduced. In Northern Europe there is a pressing need for international co-operation.

EPA Response

EPA agrees with the commenter that multiple cooling water intakes can be a significant source of aquatic organism mortality. As documented on the Hudson River, the cumulative impacts of multiple intakes has adversely affected abundance of selected aquatic species. Also, stresses on populations and communities related to cooling water intakes may not manifest immediately. Impingement and entrainment of forage fish, other food sources, and/or diminishment of ecosystem health or complexity related to the impact of cooling water intakes could contribute to stress on an ecosystem. Given that many fisheries around the world are documented as under stress, EPA believes that it is reasonable to take a precautionary approach toward protecting aquatic resources, especially in those cases where major multiple intakes exist.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.529.302

Subject Matter Code	9.3
Documentation of I & E Impacts	

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From the 1950s onwards there has been a steady development of power stations along the coasts of Britain, France, Belgium and the Netherlands. Coastal power stations, unlike most of those situated on rivers, are direct cooled and their siting is linked to their need for large volumes of cooling water (typically about 50 m3 s-1 for a 1250 MW nuclear power station). An inevitable consequence of the pumping of such large volumes of water is the entrainment of organisms into the intake stream. The fate of these animals will depend on their size. The cooling water is usually passed via a series of screens designed to stop large pieces of debris entering the condenser tubes. The finest of these screens typically have a mesh size of between 10 - 2.5 mm and will retain most fish or crustaceans greater than 50 mm in length. These retained animals are killed, even in cases where a system has been installed to wash the captured organisms back to the sea they have normally suffered considerable impact damage and are unable to survive. Organisms, which pass through the fine screens, will travel through the station condenser circuits and be discharged back to sea. Few organisms can survive passage as they suffer , mechanical damage, a rapid temperature rise of about 10 °C, exposure to biocides such as chlorine and extreme changes in water pressure. Further, the discharge point is situated well away from the extraction point to avoid cooling water re-circulation so they are normally not returned to their original habitat.

It has long been recognised that coastal power stations were killing a large number of organisms and planning applications usually meet with objections from local groups with an interest in the environment such as fishermen, bird watchers etc. In Britain it has been common practice for the power company to produce estimates of the number of fish which will be killed on the filter screens, in recent years often using an expert system called PISCES. It is then argued that while the numbers are large, they are a small proportion of the North Sea or North East Atlantic population or the numbers killed by commercial fishing eg Turnpenny (1988). However, the total impact of all the intakes acting upon the populations has never been considered. By combining data from a number of studies, some difficult to obtain, it can be shown that the impact may not be as insignificant as currently assumed.

It is useful to separate the estimation of impingement mortality (the number killed on the filters) from passage mortality (the number killed passing via the condenser circuits) because they must be estimated in different ways. Mortality rates were sought for all the major power stations in the British Isles and adjacent countries taking water from areas which share the same fish population with Britain (Fig 1). Impingement mortalities were either obtained from the literature, calculated from survey data or estimated by extrapolation from adjacent power stations for which surveys had been undertaken under the assumption that they would catch similar numbers per unit volume. Because contemporaneous estimates for all the power stations were unavailable, the annual catches were calculated for studies carried out between 1971 and 1996. The aim was to produce an overall estimate for a typical year to assess the general scale of the problem. Most estimates refer to plant operation in the 1980's. Similar, if not larger losses are probably occurring today. However, it is difficult to obtain information on present or planned plant operations as these are viewed by the privatised British power companies as commercial secrets. For some stations estimates could not be obtained.

Almost all inshore fish species are vulnerable to capture by cooling water intakes. The stations listed in Table 1 have caught 119 of the 122 inshore species known from the region Henderson (1989).

Table 1 gives the estimated total annual mortality through impingement for each station under the assumption that all the installed capacity is in constant use. For the 33 stations for which estimates could be obtained the annual mortality is estimated as 5.7 x 10^8 individuals > 3 cm long. These stations hold 83% of the total installed pumping capacity. Plant availability and demand are constantly changing, but, an estimate would be that 50-75% of the installed generating capacity is used per annum suggesting an total annual mortality on the filter screens of between 3 and 5 x 10^8 individuals. Also included are estimates of passage mortality for stations where survey data are available or extrapolations can be made. Because egg and larval distribution is patchy it is not possible to extrapolate between sites where the intakes are more than a few kilometres apart. Whereas impingement mortality is dominated by catches at continental stations where smaller animals are retained because of the smaller filter mesh sizes used, entrainment is higher at British stations. Reliable estimates of total mortality for all the stations cannot be given but indications are that total for eggs and fish < 3 cm long are of the order of 10^10 and 10^14 individuals per annum respectively.

Power station catches are dominated by small, young fish and recruitment varies considerably between years. At Hinkley Point B, in the Bristol Channel systematic sampling commenced in October 1980 and is still continuing , over a 15 year period estimated total annual captures ranged from 6.0 x 10^5 to 1.7 x 10^6 (mean 9.91 x 10^5, standard deviation 3.7 x 10^5). Similar levels of between year variation can be anticipated at other sites. At sites where large numbers of clupeid fish are caught variability is higher. At Paluel for example between year variation in the catch of sprat Sprattus sprattus and herring resulted in the annual catch changing by a factor of 10 between consecutive years (Table 1). Similar variability has also been observed at Dungeness where occasional massive captures of sprat have resulted in complete blockage of the filter screens and station closure. The wide geographical and temporal spread of the stations under consideration and the studies undertaken probably ensure that the total estimate for all stations is not exaggerated by unusual events. In the case of Paluel the annual impingement total for 1985 rather than the higher 1984 value was used. Likewise for Sizewell and Dungeness estimates were for years when no large herring or sprat captures occurred.

Dramatic as these numbers are they have little meaning unless compared against either population size or mortality rates from other causes. While it would easy to point to cases where isolated, populations in the vicinity of intakes have been damaged or destroyed. The objective here is to consider if mobile, widely distributed fish are also likely to be suffering significant losses. Only in the case of commercial fish do we have estimates of population size or mortality rate to compare the moralities against. To give some appreciation of the significance of the numbers a series of different approaches are taken for 6 wide spread species each representing a different life style. Sole, Solea solea is an abundant, commercial, flatfish in the Southern North sea and Atlantic coasts of Britain. It produces planktonic eggs and the young fish first settle close inshore. The herring, Clupea harengus was once the most important European commercial species. Populations of this pelagic species are now much reduced because of over-exploitation. The eggs are benthic and thus not sucked in with the cooling water. However, the larvae and young are vulnerable. The eel, Anguilla anguilla is a catadromous species with an extended life cycle , it is one of the most abundant species in European rivers and estuaries. It

breeds in the Sargasso sea at an age of 7 or more years. The larvae cross the Atlantic and enter European estuaries and rivers as glass eels. Bass, Dicentrarchus labrax is a marine fish with a geographical range from Northern England to the Mediterranean. It uses estuarine nurseries and remains close inshore for the first three years of life. It spawns offshore so the eggs and young larvae are not vulnerable to intakes. Twaite shad, Alosa fallax, is an anadromous member of the herring family which was common and widely distributed in Northern European estuaries but is now considered endangered.

For sole, power station and commercial fishing mortality can be compared using the Equivalent Adult Value (EAV) method Horst (1975), Turnpenny (1988). This approach allows for the fact that most sole killed by power stations are younger than those taken by the fishing boats. Fish number are converted to the equivalent number of 3 year old fish, which is the age at which they enter the commercial fishery and start to reproduce. It is calculated as:
EAV(t) = 1/S(t)F(a),

where: S(t) is the probability of survival to age t, and F(a) the average lifetime egg production..

F(a) is calculated as:

[see original for equation]

where: a is the age at which > 50% of the fish are mature, m the number of age classes in the population, P(j) the proportion of females mature at age j, S(j) the probability of survival from age a to j, E(j) average fecundity at age j, and R(j) proportion of females in age class j.

Sole are particularly abundant in the Southern North Sea so the calculations were carried out for ICES area IV c (Fig 1). Seventeen large power stations are sited in this region, under the assumption they are all working at full capacity Table 2 gives the total mortality and EAV by number and weight of the catch. As there are no data demonstrating the capture of larvae it has been assumed that larval mortality is negligible. The maximum total AE weight of the annual fish kill is estimated to be 4.27 x 10^5 Kg. This value is 58.5% and 10.5% of average British and International sole landings for area IVc for the years 1989-91 and 1986-88 respectively (MAFF fisheries statistics). Because of variable power station operation the actual value for the years 1985-1992 was probably between 50- 75% of the maximum. However, it is known that larval sole are caught at some stations (Dempsey, 1983) and it is certain that small sole are penetrating the 10 mm mesh screens of British Stations as French stations are recording such fish on their 3 mm screens. These animals are unquantified and not included in the above estimates. While much uncertainty remains about the number killed it is clear that it is large and significant even when compared with commercial fishing mortality.

The AEV approach could also be applied to other commercial species such as herring Clupea harengus. It was recently estimated that for east coast British stations alone the AEV of 435 tonnes per annum was 50% of the average annual British commercial landings for ICES area IVc between 1989-91 (Nuclear Electric Plc unpublished report). However, it can be argued that long-term overfishing has reduced recent commercial landings to an unusually low level producing a false comparison. The above calculation only considered English power stations for which reliable data exists, continental and Scottish stations are also situated in important herring nursery and spawning

areas resulting in extraordinarily high moralities. For example, single filter screens at Paluel and Graveline were estimated to catch 1.55 x 10^7 and 1.16 x 10^7 O-group herring per year respectively. Mortality rates of 10^6-10^7 per annum of post-larval fish are also observed at Scottish stations. Such mortality rates are a cause for concern when the main North Sea fishery is about to be closed again because of declining stocks assumed to be caused solely by over-fishing.

The eel, Anguilla anguilla, supports a small commercial fishery for which no landing statistics are available. This common and widely distributed fish has declined in abundance in many European rivers including the Thames Naismith &Knights (1988). Unlike most fish it is caught both by stations sited on rivers and the coast. Because of their shape elvers and glass eels are not impinged on the filter screens. An unquantified but large number of these are known to pass via the cooling circuits of estuarine stations such as Hinkley Point. Large individuals caught while returning to sea to spawn can be quantified. For the 18 power stations included in Table 1 for which reliable data exists eel impingement was available the number killed between 1980 and 1990 was about 2.4 x 10^5 per annum. This indicates that total annual catch of maturing eels by coastal European stations in N Europe is of the order of 10^6 individuals. However, this is only part of the destruction suffered by eel. They are also killed in considerable numbers by both freshwater thermal and hydroelectric power stations. For example, a study of fish impingement at six Dutch freshwater stations gave an estimated total annual mortality of 1.17 x 10^5 Hadderingh et al. (1983). When the sum effect of all these sources of passage and impingement mortality is considered it seems likely that they are one of the most important sources of mortality suffered by eel. Future assessments of the reasons for the decline in abundance should include estimates of intake and turbine passage mortality.

Bass, Dicentrarchus labrax, acts as an example of the manner in which power plant mortality acts against conservation measures. Bass biology and conservation has been recently reviewed Pickett & Pawson (1994). Following concern about declining catches during the 1980's inshore estuarine nursery areas were defined where fishing is restricted. Consideration was given to the effect of power stations and impingement of O-group bass was considered insignificant at Kingsnorth power station where it was estimated that during the winter of 1987/88 2-5% of the local population was killed on the filter screens Pickett and Pawson (1994). However, no consideration was given to captures at Grain, W. Thurrock, Littlebrook and Tilbury which are also situated within the Thames estuary nursery. For comparison, Kingsnorth and W. Thurrock kill an estimated 7.7 x 10^3 and 43.5 x 10^3 bass per annum respectively, suggesting that mortality at W. Thurrock and Littlebrook may have been a more important impact on the population. Another important nursery is the Severn estuary. During the 1980's two power stations, Berkeley and Oldbury operated in the upper estuarine zone which was the centre of distribution of the young bass. Berkeley is now closed. The estimated annual catch at Oldbury was 1.49 x 10^5 individuals, Berkeley was probably catching similar numbers. Other power stations operating in the Severn estuary / Bristol Channel and capturing juvenile bass were Hinkley Point A & B (2.7 x 10^3 per annum), Uskmouth, Aberthaw and Pembroke. It can be argued that the MAFF policy to protect nursery areas was flawed, perhaps of negligible benefit, because it imposed no regulation upon the power companies which were the single largest killer of juvenile bass. Similar arguments could be made for continental countries, Paluel for example catches an estimated 2.16 x 10^5 per annum at full capacity. For the 18 power stations included in Table 1 for which reliable quantitative data on bass impingement was available the number killed between 1980 and 1990 was about 4.7 x 10^5 per annum. This number is increasing as bass are extending their range to the north.

The above considerations have all been directed at wide-spread abundant species. Power stations also impact species such as the twaite shad, Alosa fallax, which is restricted to only four British breeding populations. It is caught by power stations in the vicinity of the Thames and Severn estuary. The largest British population is in the river Severn where Hinkley Point A , B and Oldbury power stations killed an estimated average of 4.17 x 10^4 individuals per annum during the 1980's. Smaller mortalities will also have occurred at Berkeley, Uskmouth, Aberthaw and Pembroke. Most of the killed shad are O-group 40 to 80 mm in length. At present the River Severn population seems not be under threat, but, there is sufficient concern for the species to listed under schedule 5 of the Wildlife Conservation Act. As in the case of bass an integrated conservation policy needs to assess power station losses.

The calculations presented show that power station intakes are probably having a measurable effect on inshore fish abundance. If, as is widely believed, commercial fishing is damaging Southern North Sea fish stocks then losses on power station intakes must also be considered an important loss. It may be necessary to include intake losses in North Sea fisheries models. The extent of the problem has not been appreciated before because the effects of each station and the actions of each country were considered in isolation and with some secrecy. The full extent of the problem is larger than presented here as no estimates are presented for deaths on other cooling water intakes such as those of petrochemical plants. There is a strong argument for a joint European approach to assess the effects of water intakes in the same manner as that for commercial fish regulation. The individual species selected above were not chosen because of particular vulnerability to power stations. Species such as sprat Sprattus sprattus, whiting Merlangius merlangus, sand goby Pomatoschistus spp., and flounder Platichthys flesus are caught in greater numbers. The selected species all share growing concern about their declining abundance and it has been previously argued there is no evidence for power stations having an appreciable impact Turnpenny (1988) . Similar calculations of annual mortality could have been presented for a further 80 frequently caught species. Even if it is accepted that electricity requirements can only be economically met by direct cooled power stations there are still many measures that could be taken to reduce the present destruction.. These include 1) installation of fish deterrent and return systems, 2) careful design of intake position, 3) seasonal switch of production between plants to avoid using water when large numbers of fish are present. In the future, it may be necessary to curtain further extraction.

The arguments presented here have only considered direct mortality. Power station intakes kill far more invertebrates by weight or number than they do fish. The effects of these losses has yet to be assessed either in terms of their immediate effect on the populations of the killed animals or on its impact on the inshore ecosystem. The ecological problem presented above is not unique to Europe, it is a global problem, and it is clear that similar or even greater levels of mortality occur in North America and Asia.

EPA Response

EPA agrees with the commenter that many measures can be taken to reduce aquatic organism mortality from cooling water intakes and that is the purpose of today's rule. Reducing impingement mortality and entrainment from cooling water intakes is also important because many of the fish stocks subject to impingement and entrainment are also under substantial fishing pressure or are adversely affected by other anthropogenic stressors.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.529.401

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper

Dear Reed,

In Section II-G.1, the EPA indicates that it intends to revise the operation and maintenance costs of its estimates for wet and dry cooling towers to include the marginal cost of energy penalties. The EPA has indicated it intends to estimate energy penalties as compared to cooling systems that new facilities would be likely to install absent final regulations. In the interest of providing input to the EPA regarding the potential magnitude of these costs, and at your behest, we have conducted a scenario analysis of the costs of upgrading a once-through system to a) a closed cycle system and b) a dry cooling system. The purpose of this analysis is to include the energy penalty for such systems and to estimate the incremental costs per kWh from the upgrade.

A case study approach was taken for a particular power plant. For the purpose of this analysis, the Indian Point Units 2 and 3 in New York were considered. The full costs of each alternative cooling option, including a 1.5% combustion efficiency penalty and a capacity derating penalty, were calculated for each plant and the results compared with a business-as-usual scenario for each plant. The scenarios consider the full additional expense for each upgrade, including: the costs to purchase and install a new cooling system at each plant, the additional annual expenditures for operations and maintenance of the new systems, the change in fuel consumption that may result at the plants as a result of installing a different type of cooling system, and any replacement power expenditures that might be incurred due to extended plant outages for installation of the new equipment. The assumptions, methodology, detailed results, and sources are presented in the attached report. Please note that this report is still a draft report, and may be revised in the future as we assemble additional data.

The results of the analysis show that converting the Indian Point Units 2 and 3 to closed cycle cooling systems would decrease the amount of water withdrawn from the Hudson River by these plants by over 97% with a small cost impact. In terms of the cost for producing power, the incremental cost for the installation and use of a closed cycle cooling system is 0.01 to 0.03 cents per kWh. Converting the Indian Point 2 and 3 to a dry cooling systems closed cycle cooling systems would further decrease the amount of water withdrawn from the Hudson River and reduce river impacts even further than a closed cycle system with only a modest cost impact. In terms of the cost for producing power, the incremental cost for the installation and use of a hybrid cooling system is between 0.14 and 0.19 cents per kWh and 0.21 to 0.27 cents per kWh for a dry cooling system. Please refer to the report for details regarding the bases for these cost results.

EPA Response

EPA addresses the referenced study and specific points therein via responses to comments #316bNFR.529.501 through #316bNFR.529.506. As discussed in these responses, EPA generally finds fault with supporting assumptions, conclusions, and results of the study. First and foremost, EPA

notes that the cost study is for an existing power plant retrofit scenario and is not appropriate for comparison to the costs of this new facility rule. EPA considers the impact results, especially for the case of the dry cooling technology upgrades, to be understated.

With regards to the energy penalty referenced by the commenter ("a 1.5% combustion efficiency penalty"), EPA notes that the commenter, as documented in subsequent comments, utilizes this figure to represent a performance penalty of dry cooling versus once-through cooling. As can be seen in information provided in Chapter 3 of the Technical Development Document, EPA considers this performance penalty to be significantly underestimated. EPA notes that the commenter uses the term "efficiency penalty," which EPA interprets as the turbine performance penalty (which is one of three components of the energy penalty; fan and pumping components are the other two components). Through detailed study, EPA determined that a realistic mean annual turbine performance penalty for a dry cooling tower (as compared to a once-through system) at a nuclear plant would be approximately 6.1 percent. In the Northeastern US, EPA estimated a mean annual turbine performance penalty of 5.0 percent. For the purposes of calculating the economic consequences of a performance penalty, these values represent realistic reductions in plant efficiency expected for a dry cooling system. However, for comparison to the reference scenario of a once-through cooling system, EPA estimates the total mean annual energy penalty of dry cooling (as compared to once-through) as 8.5 percent for the national average and 7.4 percent in the Northeastern US. (These values incorporate the pumping and fan operating components.) Therefore, the energy penalty estimates utilized by the commenter in their cooling system upgrade analysis significantly understate the economic and energy consequences of the cooling system upgrades.

Comment ID 316bNFR.529.501

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper

Executive Summary

Converting the Indian Point Units 2 and 3 to closed cycle cooling systems would decrease the amount of water withdrawn from the Hudson River by these plants by over 97% with a negligible cost impact. As a percentage of each plant's total revenue requirement over its expected generation between now and the end of its current operating license, the cost impact is between 0.24% (Unit 3) and 0.58% (Unit 2). In terms of the cost for producing power, the incremental cost for the installation and use of a closed cycle cooling system is 0.01 to 0.03 cents per kWh.

Converting the Indian Point 2 and 3 to hybrid or dry cooling systems closed cycle cooling systems would decrease the amount of water withdrawn from the Hudson River and reduce river impacts even further than a closed cycle system with only a modest cost impact. As a percentage of total revenue requirements, the cost impact for the entire Indian Point plant is between 2.97% (hybrid) and 4.25% (dry cooling). In terms of the cost for producing power, the incremental cost for the installation and use of a hybrid cooling system is between 0.14 and 0.19 cents per kWh and 0.21 to 0.27 cents per kWh for a dry cooling system.

As shown in Figure ES-1 below, the cooling systems at Indian Point 2 and 3 could be retrofitted to any of the three technologies examined in this analysis with a very small to modest impact on the total cost of power generated at these facilities.

[see original for Figure ES-1]

Since New York's electric market now operates on the basis of a competitive bidding system, continuing to allow Indian Point Units 2 & 3 (and other plants with once-through cooling systems) to avoid such modest upgrade costs, amounts to an indirect subsidization of these plants and their disproportionate impact on the Hudson River ecosystem.

EPA Response

EPA reviewed the Tellus Institute study summarized in this comment and refers to comments #316bNFR.529.501 through #316bNFR.529.506 here. EPA notes that the study applies to an existing facility and, therefore, is for that reason inappropriate for comparison to the situation of new facilities. In addition, EPA finds fault with a variety of issues in the analysis conducted by the Tellus Institute, especially with those addressing upgrades to dry cooling systems. EPA also found through its review several areas of the analysis relating to existing facilities that were not fully explained by the commenter nor supported in documentation. For these issues related to the existing facility analysis EPA poses questions and unresolved existing facility issues that it intends to resolve during the rulemaking process of the existing facility review.

Technical and Engineering Issues Relating to Both New and Existing Facilities:

- EPA disagrees with the study's use of energy penalty values of 1.9 percent for dry cooling systems, as compared to a once-through system. The reference cited to justify these penalties is for a combined-cycle plant, and no mention is made of the type of penalty this represents (for example, annual, minimum, or peak). EPA's detailed research into energy penalties for a variety of conditions and power plant types shows significantly higher energy penalties for dry cooling system upgrades at nuclear power plants. EPA's data were developed to represent penalties at new power plants, and therefore may underestimate slightly the penalties at retrofit situations when an indirect dry cooling system is used. However, a far more reasonable energy penalty calculation would be greater than 8 percent mean annual energy penalty for a dry cooling system as compared to a once-through system. EPA reiterates that this value was calculated for direct-acting dry cooling systems at new plants which are much more efficient designs than retrofitted shell and tube heat exchanger configurations, such as that used in the study. The effect is such that the study's annual replacement power costs due to energy penalties would be at least 4.5 times higher than estimated.

- EPA finds fault with the inclusion of year 1999 and 2000 costs in the net present value estimates for reference scenario, as presented in the supporting documentation. The net present value calculations for the upgrade options have a different base year than those for baseline and only include costs from 2001 on, even though their first associated costs are in years 2004.

- EPA disagrees with study's design basis for the recirculating tower (and in turn the hybrid & dry towers) as 600,000 gpm recirculating flow rate. The question begs: Why not use the full baseline cooling flow in each unit? In EPA's view, this could partly account for the difference (which so confused the authors) between their capital cost estimates and those of the Power Tech report, in addition to the retrofit estimation differences between the two studies (note: Power Tech estimated a 42 % retrofit estimate to the cooling upgrade costs versus the 14 % estimated by the commenter).

- The referenced 1992 Stone & Webster study estimated that O&M costs for retrofitted plants were 0.7% of the total retrofitted capital cost, as calculated in that study. However, the retrofit inflation ratio used by Stone & Webster for cooling tower (only) capital costs is higher than the Tellus estimate (see below). In addition, the Stone & Webster study assumes that the condenser and conduit system must be replaced as a result of the retrofit. The Tellus study does not assume that condensers would be replaced, nor the conduit systems associated with this. In addition, the Tellus study estimates that douglas fir mechanical draft towers are the cost basis for wet cooling towers, rather than concrete natural draft towers as estimated in the Stone & Webster study. O&M costs for a natural draft tower are slightly smaller in magnitude than for compared sized mechanical draft systems. Therefore, a conversion of O&M as a percent basis of capital costs is not appropriate for the two different tower designs, in addition to the problems mentioned regarding retrofit costs. In the end, the cooling tower O&M costs for Stone & Webster, when properly adjusted to a cooling tower only basis are 3.4 percent. Therefore, the Tellus study, in EPA's view has misinterpreted the basis of the Stone & Webster O&M costs, which it referenced. The Stone & Webster data suggests that the Tellus study has used O&M costs that are 5 times less than those referenced. EPA's own estimates of the O&M costs of cooling towers of similar size show O&M costs even slightly higher (on a comparative basis) than those from Stone & Webster.

- EPA disagrees with the study's estimation that the initial years for capital costs occur in the year following when the upgraded system comes on-line. In EPA's view, some of the capital costs would be incurred during the first year of operation.

Issues Related to Existing Facilities

- EPA reviewed the reference cited (Stone & Webster 1992) for confirmation of the 14 percent retrofit estimate quoted by the commenter and could find no such value. On the contrary, EPA determined that the retrofit estimate developed by the reference for a 1100 MW nuclear power plant retrofit of a wet cooling tower would imply that a 14 percent value was never used. For instance, the capital cost of the cooling tower itself was $52,280,000 (1992 $), which is $63,551,600 in 1999 dollars. This value is very similar to the total capital cost of the entire project estimated by Tellus. However, this is only Stone & Webster's estimate of the cost of installing the cooling tower and excludes the costs of retrofitting the condenser, associated conduit system, civil works efforts, and intake retrofit costs. All told, Stone & Webster include $169,418,000 (1999 $) of total retrofit related costs for the nuclear plant upgrade to a wet cooling tower. EPA does not agree with these estimates, but includes them here to illustrate that the 14 percent estimate of retrofit costs quoted by Tellus does not accurately represent the referenced material. If one calculated the itemized "retrofit costs," without including the associated condenser/conduit and intake retrofit activities, the Stone & Webster ratio of retrofit costs to installed cooling tower (only) costs would be 105 percent. Again, EPA does not agree with these estimates, but points to their striking deviation from the 14 percent value quoted by the commenter. In addition, the Power Tech report specific to Indian Point, and developed by the former owners (Com Ed) and the State of New York show retrofit estimates of 42 percent to a hybrid cooling system. This may reflect an upgrade or change in condenser design, which the Tellus study does not include.

- EPA questions the annual debt payments estimated for each unit in the reference scenario. EPA questions whether debt payments from a change in ownership late in the life of a nuclear plant are nationally applicable for a new facility rule.

- EPA notes that the study has apparently made an error in the decommissioning annual costs for unit 1 for the period 2001 to 2012. The value of the annual payment stated in the study's write-up is 17.2 million. The period 2001 to 2012 has an inflated value of 23.2.

In the end, these key design, economic, and costing estimates have the effect of dramatically understating the cost implications of the dry cooling system upgrades. See response to comment #316bNFR.529.009 for a summary of EPA's estimates of appropriate costs to rate payers for the final new facility rule.

Comment ID 316bNFR.529.502

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Background

Several electric power stations located along the Hudson River (Roseton 1 & 2, Indian Point 2 & 3, and Bowline Units 1 & 2) are subject to renewal of their State Pollutant Discharge Elimination System (SPDES) permit. Once-through cooling systems are used at each of these units. Negotiations for upgrading these units with closed cycle or other cooling system designs has been part of a long and arduous settlement process dating to 1975, when the EPA issued a permit for the Indian Point units requiring the erection of cooling towers to reduce waste heat discharges to the Hudson River.

A Settlement Agreement, having a 10-year term, went into effect in 1981 under which the units were permitted to continue operation of their once through systems. Soon after expiration of this Agreement in 1991, the utilities applied for renewal of their SPDES permit and submitted a draft Environmental Impact Statement (DEIS) in which they maintained that future operation of these power stations using existing once-through cooling systems will have little detrimental effect upon the fish and crustaceans living within the Hudson estuary.

This conclusion of the DEIS is under dispute by other parties and forms the current context for intervenor negotiations regarding permit renewal. Alternative cooling technologies would lead to steep water withdrawal reductions, much slower withdrawal velocities, and would offer far more effective fish-saving measures than the variety of mechanisms offered in the DEIS.

EPA Response

See response to comment #316bNFR.529.501.

Comment ID 316bNFR.529.503

Subject Matter Code	21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule	

Author Name David K. Gordon & Reed W. Super

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Purpose of this Analysis:

The purpose of this study is to determine the cost implications of retrofitting the existing once-through cooling systems at Indian Point 2 and 3 nuclear power plants with either a) a closed cycle cooling system, b) a hybrid wet/dry cooling system, and c) a dry cooling system.

EPA Response

See response to comment #316bNFR.529.501.

Comment ID 316bNFR.529.504

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Subject Matter Code 21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule

Methodology

To assess the cost implications of each alternative cooling technology, we followed the approach outlined below:

1) Characterize cost and performance of the nuclear units. This involved gathering data on the plants' historical generation, operating costs, trends in nuclear fuel prices, and other major operating cost components. Each cost component was projected until the expiration of each plants current operating license. A summary appears in Annex A.
2) Characterize the cost and performance of cooling technology alternatives. This involved acquiring capital and operating cost information on closed cycle, hybrid, and dry cooling systems. Each cost component was projected until the expiration of each plants current operating license. A summary appears in Annex B.
3) Determine timeframe for analysis and other major assumptions: The operative assumption was that the plants would continue operation until the end of the current license period – 2013 for Unit 1, and 2015 for Unit 2. The base year for the analysis was 2000. Other major assumptions are summarized in Annex C.
4) Develop Scenarios. To determine the cost impact of upgrading Indian Point 2 and 3 with alternative cooling technologies, we considered four scenarios for each unit, as follows: a "Business-as-usual" scenario assuming continuation of the existing once-through system at each unit; a "closed cycle cooling" scenario assuming retrofitting of each unit to closed cycle cooling; a "hybrid cooling" scenario assuming retrofitting of each unit to hybrid system cooling; and a "dry cooling" scenario which involved retrofitting of each unit to dry cooling.
5) Calculate the impact of each scenario. This involved the calculation of the incremental levelized cost of each scenario. Results are expressed in percentage terms as the ratio of the incremental levelized cost of each scenario relative to the levelized cost of the "Business-as-usual" scenario."

The data sources used are summarized in Annex D.

It is important to note that this analysis does not attempt to:

** Estimate the external benefits to surrounding communities from reducing water usage and current impacts on the health of the riparian ecosystem under each scenario.
** Determine the costs to nearby communities of these facilities' current water impacts
** Construct a comprehensive projection of capital and O&M costs for the units. We used a simpler estimation method based on industry-derived statistics and publicly available data on each units' historic operations.
** Determine the optimal cooling technology and time schedule for installation at the Indian Point units.
** Compare the costs of these alternative scenarios with the company's plans to reduce water impacts at the site.

** Determine the sensitivity of our assumptions to alternative operating scenarios, such as: alternative timetables for retrofitting, relicensing scenarios, or any other contingencies that might affect each plant's future operations either positively or negatively.

EPA Response

See response to comment #316bNFR.529.501.

Comment ID 316bNFR.529.505

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Results

In this section we present the costs of upgrading the cooling systems at the Indian Point 2 and 3 nuclear power plants to each of the more modern, lower-impact cooling technologies discussed above.

The full costs of each alternative cooling option were calculated for each plant and the results compared with a business-as-usual scenario for each plant. The scenarios consider the full additional expense for each upgrade, including: the costs to purchase and install a new cooling system at each plant, the additional annual expenditures for operations and maintenance of the new systems, the change in fuel consumption that may result at the plants as a result of installing a different type of cooling system, and any replacement power expenditures that might be incurred due to extended plant outages for installation of the new equipment.

Detailed cost summaries are provided in Annex E. A summary of results is presented in the Table 1 below.

[see original for table]

EPA Response

See response to comment #316bNFR.529.501.

Comment ID 316bNFR.529.506

Author Name David K. Gordon & Reed W. Super
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Subject Matter Code 21.1
Facility-incurred Costs as a Result of Compliance with Proposed Rule

Discussion

Converting Indian Point 2 and 3 to closed cycle cooling systems could dramatically decrease the amount of water withdrawn from the Hudson River. Yet, as the results above clearly indicate, it would a negligible cost impact on each plant's total revenue requirement when averaged over its expected generation between now and the end of its current operating license. In terms of the cost for producing power, the incremental cost for the use of a closed cycle cooling system is just 0.01 to 0.03 cents per kWh.

Converting the Indian Point 2 and 3 to a hybrid cooling system could decrease river impacts by even more. The cost impact for the site, as noted above is also minor – an incremental cost of roughly 3.0% over the expected life of the plant. In terms of the incremental cost for producing power, hybrid systems would add only 0.18 to 0.24 cents to the cost of generation at these plants.
A dry cooling system would decrease current water use impacts on the river system most of all. Nearly 100% of the two plants' combined intake would be avoided. Yet, the incremental cost is only 4.1% more than business-as-usual case, or roughly an additional 0.24 to 0.32 cents per kWh to the average cost of generation.

Even for the most expensive option, the annual cost incurred by the plants' owner for the additional protection of the water resource would be less than current annual expenditures on local taxes, contributions to plant decommissioning funds, and other ordinary operational expenses. A comparison of these costs is shown Table 2 below.

We conclude that the cooling systems at Indian Point 2 and 3 could be cost effectively converted to any of three technologies examined in this analysis.

[see original for Table 2]

Moreover, since New York's electric market now operates on the basis of a competitive bidding system, continuing to allow Indian Point Units 2 & 3 (and other plants with once-through cooling systems) to avoid such modest upgrade costs, amounts to an indirect subsidization of these plants and their disproportionate impact on the Hudson River ecosystem. Most competing thermo-electric power plants in New York today are not permitted to use once-through cooling systems. Consequently, the typical water withdrawals of most other New York power plants are less than one-fiftieth as much per unit of electric output as the Indian Point Units. (NRC, 1996) There is no technical reason why such a two-tiered standard should exist for water withdrawals and discharges. Cooling system technologies and costs are standard regardless of plant fuel-type. Other power plants operating in New York today with closed cycle, hybrid, or dry cooling systems are slightly disadvantaged competitively by the added cooling costs that they incur by being held to a higher environmental standard while other generators are not.

Though not specifically considered in this study, if either one or both plants were to relicense to continue operations beyond the end of their current operating licenses, then the costs incurred for their new cooling systems would be reduced by even more.

To provide perspective, one can also compare the above incremental cost results with the incremental costs of controlling air pollutant emissions for the utility and industrial sectors. For example, the incremental O&M costs for flue gas desulfurization, a type of pollution control technology for reducing sulfur oxide emissions, is roughly between 0.6 cents/kWh to 1.3 cents/kWh (Von Hippel, 1996). Other types of technologies to control nitrogen oxide emissions are roughly in this cost range.

EPA Response

See response to comment #316bNFR.529.501.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

On Behalf Of:

Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Author ID Number:

316bNFR.530

Note

No comments entered, as these comments duplicated an earlier submission. Comments for this author are coded under 316bNFR.514.

Comment ID 316bNFR.530.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

No comments entered, as these comments duplicated an earlier submission. Comments for this author are coded under 316bNFR.514.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Mark E. Watson

On Behalf Of:

USF/Johnson Screens

Author ID Number:

316bNFR.531

Comment ID 316bNFR.531.001

Subject Matter Code 13.1

Requirement of 0.5 fps

Author Name Mark E. Watson

Organization USF/Johnson Screens

USF/Johnson Screens is a market leader in technology and supply of intake screens worldwide. It has long established the industry and regulatory standard of 1/2 foot/second thru slot velocity as the maximum velocity in terms of fish and aquatic life protection. The off-shore industry's objection to this limit of velocity on the basis of a need for higher velocities for minimization of marine growth on the screen surface may be resolved by an alternate copper based material, we call Z-Alloy, that is specifically designed to repel the attachment of zebra mussels in fresh water intake systems. Over the last tens years, this material has proven extremely effective in keeping intakes clear of this underwater problem.

As other opportunities have occurred, we have also found that Z-Alloy is effective in reducing biological attachment in general in many applications, induding the marine environment as is being considered in these regulations.

EPA Response

EPA agrees with the commenter that a variety of alternative technologies, such as the Z-Alloy, exist for dealing with biofouling. Given the compilation of supporting data presented in the proposed rule, the NODA, and other information in the record of this rulemaking, for the final rule, EPA has retained the intake velocity requirement of 0.5 ft/s through-screen velocity that EPA proposed.

See responses to comments 316bNFR.023.008 and 316bNFR.028.031 for information regarding biofouling issues.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Henrietta Groot

On Behalf Of:

Coastal Alliance on Plant Expansion

Author ID Number:

316bNFR.532

Comment ID 316bNFR.532.001

Subject Matter Code 7.1

Definition: New Facility

Author Name Henrietta Groot

Organization Coastal Alliance on Plant Expansion

Morro Bay is a small natural tidal estuary on the central coast of California (see map and aerial photo). The seaward portion of Morro Bay is navigable. The entrance to Morro Bay is protected by rock jetties, and the channel is maintained for the Army Corps of Engineers. Morro Bay supports a small commercial fishing and tourist economy.

Since 1954, Morro Bay has been the home of the Pacific Gas and Electric Morro Bay Power Plant. The MBPP cooling water intake structure is located at the bay front, where the entrance channel turns 90 degrees to the South (see map). The cooling water discharge is at the shoreline, where Morro Rock meets the beach. (see map.)

The technology of the MBPP Cooling water intake structure is pre-Clean Water Act, pre-California Environmental Quality Act – bar racks and traveling screens. The structure has not been modified since the 1960's, when the number on intake bays was increased from four to ten. The 1960's expansion of the CWIS provided once-through cooling for two new generating units at MBPP.

No technology within the CWIS returns impinged animals to the estuary. Impinged animals are removed from the screens with high-pressure water and thereby killed, before they are returned to the ocean through the thermal discharge tubes.

Duke Energy North America bought the MBPP in 1998, just as California its ill-fated deregulation experiment. DENA immediately applied to the California Energy Commission to demolish the existing steam generating plant and to the build a completely new combined cycle facility on the 107-acre site. The old plant generated 1030 MW. The two, new proposed combined cycle units are said to produce 1200 MW (600 MW each).

Duke Energy North America (DENA) proposes in their NPDES application to make no changes to the fifty-year old CWIS or the shoreline discharge, except to claim that the cooling water intake volume will be reduced and the temperature of the thermal effluent will be lower. DENA's application calls for changing out all the pumps in the CWIS.

Our group, the Alliance, was formed when DENA submitted its application for the new plant, because we are concerned about the long-term extraction of cooling water from this very small estuary.

We hope that our general comments, using Morro Bay as an example, will persuade your staff that your regulations for new facilities must prohibit State and Regional Water Boards and certified agencies of EPA from issuing new NPDES permits for new steam-electric plants which continue to use fifty-year old CWIS technology.

EPA Response

In this rule EPA has defined a new facility in a manner consistent with existing NPDES regulations, with a limited exception. EPA generally deferred regulation of new sources constructed on a site at which an existing source is located (see 40 CFR 122.29(b)(3)) until the Agency completes analysis of its questionnaire data on existing facilities. However, in addition to meeting the definition of a new source, today's rule requires that a new facility have a new cooling water intake structure or use an existing intake structure that has been modified to increase the design capacity. Thus, it might be possible to completely demolish an existing source, replace it with a smaller-capacity new source, and not be regulated under today's rule as a new facility. This facility would then be an existing facility and as such the requirements applicable to such a facility will be addressed in Phase II and III.

Comment ID 316bNFR.532.002

Author Name Henrietta Groot

Organization Coastal Alliance on Plant Expansion

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

d. The STATIC (non-tidal) volume of Morro Bay is about 2000 acre feet.

e. The existing MBPP withdraws 2200 acre feet per day from the Morro Bay estuary, more than 100% of the estuary's volume below MLW.

f. The Proposed new facility using the original CWIS, will withdraw 2000 acre feet per day from Morro Bay. This volume is still 100% of Morro Bay's static volume and ONE HUNDRED times the volume proposed regs shall allow for new facilities withdrawing cooling water from tidal estuaries.

EPA Response

This rule applies to new facilities. Existing facilities will addressed under Phase II and III. Determining whether the MBPP is a new or existing facility is a site-specific determination.

Comment ID 316bNFR.532.003

Author Name Henrietta Groot

Organization Coastal Alliance on Plant Expansion

Subject Matter Code 13.1

Requirement of 0.5 fps

g. The cooling water intake velocities of the existing plant are .78 ft/sec. [Intake velocities and volumes for the existing facility were derived from annual monitoring documents submitted by the MBPP to the California Central Coast Regional Water Quality Control Board as a condition of the NPDES permit].

h. The cooling water intake velocities of the proposed new facility will be .68 fps. [This velocity was computed from data provided in DENA's AFC for the new facility and data on the geometry of the CWIS provided in the annual monitoring documents.

i. Duke Energy North America has consistently understated existing CWIS approach velocities by 40% in all documents submitted to the California Energy Commission and the RWQCB.

EPA Response

See response to comment 316bNFR.027.037 for information on the applicability of today's rule to existing facilities.

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Comment ID 316bNFR.532.004

Subject Matter Code 9.3

Documentation of I & E Impacts

Author Name Henrietta Groot

Organization Coastal Alliance on Plant Expansion

j. Six months ago, the Morro Bay Estuary became the 28th water body in the United States to enter EPA's own National Estuary Program. The Morro Bay National Estuary Program (MBNEP) has published its Comprehensive Conservation and Management Plan to outline restoration strategy for degraded portions of the water body, and a TMDL draft has been published.

EPA Response

EPA is hopeful of securing the information contained in The Morro Bay National Estuary Program (MBNEP) Comprehensive Conservation and Management Plan and the draft TMDL for review as part of the proposed rule for existing facilities.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

N. Jonathan Peress

On Behalf Of:

NRG Energy, Inc.

Author ID Number:

316bNFR.533

Comment ID 316bNFR.533.001

Subject Matter Code	CP
Comment Period	

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

As an initial comment, we are troubled by the fact that the one-month response period provided by EPA precluded a thorough review of the references about which the agency solicited comment. While many of these references are well known to anyone who has been in this business for more than ten years, others (e.g. 2001 emails, letters, memos to file, etc.) are not. To do this important rulemaking process justice, additional review time is appropriate and necessary.

EPA Response

EPA believes that 30 days was sufficient to provide a meaningful opportunity for public comment on the Notice of Data Availability, particularly in the context of this rulemaking which has been underway for several years. Nevertheless, on July 6, 2001, EPA published a notice, reopening the comment period for an additional 30 days for certain documents referenced in the Notice of Data Availability. See response to 316bNFR.524.086.

Comment ID 316bNFR.533.002

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

Section D.2. While NRG endorses USEPA's proposal to abandon the term "Littoral Zone" and prior proposals relating to distances outside of the littoral zone as bases for determining impact potential and design criteria, we must once again note the site-specific nature of Cooling Water Intake Structure (CWIS)/environmental impact potential combinations. Alternative language like "area of potential high impact", integral to historic 316(b) and (a) guidance, would be preferable, as long as such terminology is not implicitly equivalent to the entire inshore area. There must be provision to consider areas of potential low impact within this same zone, however defined.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.533.003

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

Section D.2. One of USEPA's proposed options is to classify all Essential Fish Habitat (EFH), as defined and mapped by the National Marine Fisheries Service (NMFS), as sensitive areas. We would encourage the agency to check some of the NMFS maps and species listings on www.nero.nmfs.gov/ro/STATES4 to see how this would result in a "sensitive" classification for all of our nation's coastal water bodies. Consider the larvae of the Atlantic mackerel (Scomber scombrus) for example. Quoting from the NMFS description —

Offshore, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine through Cape Hatteras, North Carolina. Inshore, EFH is also the "mixing" and/or "seawater" portions of all of the estuaries where Atlantic mackerel larvae are "common," "abundant ", or "highly abundant" on the Atlantic coast, from Passamaquoddy Bay, Maine to James River, Virginia.

Thus, based on just this single species, the whole northeast coast would be classified as "sensitive". One small quadrant in western Long Island Sound surrounding Norwalk, CT, and extending to Northport, NY, includes egg and/or larvae EFH for 11 species, and juvenile and/or adult EFH for 16 species.

Of these, the winter flounder is, as it is throughout southern New England, the focus of attention in our ongoing Norwalk Harbor Station NPDES renewal process with the CTDEP. Clearly, any 316(b) study and Best Technology Available (BTA) evaluation needs to be not only site-specific, but species-specific. On a final note, it should be remembered that whenever a Federal permitting agency is in charge of an undertaking that may adversely affect EFH (like dredging a channel or port), it is already required to consult with NMFS. The agency has published "An Applicant's Guide to EFH Consultations," and the US Army Corps of Engineers routinely conducts such assessments whenever a dredging operation is required (such as lengthening an intake channel). Of note, however, is that some districts only perform this exercise if NMFS has a Fishery Management Plan (FMP) in place for the EFH-listed species.

EPA Response

The final rule adopts a different approach. After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that define best technology available for minimizing adverse environmental impact in all waterbody types.

Comment ID 316bNFR.533.004

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

Section E.1. The agency has proposed to consider defining Adverse Environmental Impact (AEI) in terms of a population endpoint, or, alternatively relying on counts of entrainment and impingement. This proposal rightfully acknowledges the site- and species-specific nature of impacts, and the fact that (as USEPA notes in Section D.1 of the subject document) eggs and larvae of most species have an extremely high rate of natural mortality. Before fully endorsing this idea, however, it will be necessary for the agency to clarify just what the AEI cut-off points may be (a 5% removal rate from the population? 1,000 Equivalent Adult Losses (AEL)? annual impingement of < 10,000 fish?).

EPA Response

Please see responses to comments 316bNFR.029.013 (AEI interpretation) and 316bNFR.014.013 (two-track framework).

Comment ID 316bNFR.533.005

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

Section E.4. USEPA found that 35% of existing CWIS are in 303(d)-listed impaired water bodies. That is a logical extension of the fact that many power plants are in or near major population centers where about the water body has historically been affected by sewerage and industrial point sources, commerce, channelization anddredging, and paving. The vast majority of these 303(d)- listed water bodies, requiring TMDL (Total Maximum Daily Load) evaluations, are impaired by pathogens, nutrients, and low dissolved oxygen levels - not CWIS.

EPA Response

EPA recognizes that cooling water intake structures are not the only source of human-induced stress on aquatic communities. While recognizing that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, the Agency identified methods for generally evaluating the stresses on aquatic communities from human-induced perturbations other than fishing. Of particular importance is the recognition that stressors that cause or contribute to the loss of aquatic organisms and habitat may incrementally impact the viability of aquatic resources. EPA has examined whether waters meet their designated uses, whether fisheries are in stress, and whether waters would have improved water quality or better support their designated uses if EPA established additional requirements for new cooling water intake structures. While EPA does not believe this means that CWIS are the sole cause of these problems, it is not reasonable for industry to assert that there are no ecological problems in water bodies where CWIS are located and that CWIS do not add stress to these water bodies. EPA's record shows the converse is true; water bodies need improvement and the CWIS are one stress to these waterbodies.

EPA also recognizes that the data prepared internally by Dabolt, ("Relationship of Location to Cooling Water Intake Structures to Impaired Waters, Memorandum, April 2001) in relation to the location of the CWIS in impaired waters, does not establish that cooling water intake structures are the cause of adverse environmental impact in any particular case, and that there may be other reasons for the presence of impaired waters near cooling water intake structures. Nonetheless, this analysis suggests that many cooling water intake structures are sited within or adjacent to impaired waters, and that intakes may potentially contribute to existing stress on waterbodies and their resident biota.

Comment ID 316bNFR.533.006

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

Section E.5. USEPA states that it is considering defining a "traditional technology" (i.e. an old, simple, once-through plant and CWIS) as having an adverse impact, and going from there to evaluate the relative merits of newer or alternative technologies. As pointed out (with our own case examples) in NRG's comments on the originally-proposed rules, this is a faulty assumption in many cases. We are already doing studies to determine whether changes may be in order at some of our plants to minimize entrainment and/or impingement if rates observed are found to be too high - - not because the CWIS has already been pre-judged to be having a significant impact.

EPA Response

Please see response to comment 316bNFR.050.006.

Comment ID 316bNFR.533.007

Subject Matter Code 13.1

Requirement of 0.5 fps

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

Section F.3. The agency is proposing to use approach, rather than through-screen velocity, as a design or performance (to the extent that velocity is also a function of numbers of pumps operating) standard. As we have in our earlier comments, and as was endorsed by the panel of experts during USEPA's May 23, 2001 meeting on existing technologies, NRG supports this proposal.

EPA Response

One of the options for complying with the final rule requires meeting a design intake velocity requirement measured as through-screen velocity. See response to comment 316bNFR.056.041 for information on why EPA did not adopt approach velocity as the preferred measurement method.

Comment ID 316bNFR.533.008

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name N. Jonathan Peress

Organization NRG Energy, Inc.

Section G.4. USEPA's Source Water Baseline Characterization costs, even as revised, are still grossly underestimated. Remaining undefined are exactly what sampling design, frequency of sampling, and number of entrainment samples were assumed by the agency in its derivation of these numbers.

EPA Response

See Response to Comment 316bNFR.525.032.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kevin Eisenbeis

On Behalf Of:

MidAmerican Energy Company

Author ID Number:

316bNFR.534

Comment ID 316bNFR.534.001

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

In its NODA, EPA invited commenters to submit additional aquatic, impingement and entrainment studies documenting the absence of significant environmental impacts associated with cooling water intake structures (CWIS). In response to this invitation, MidAmerican Energy is submitting the results of a comprehensive long-term aquatic study conducted at MidAmerican Energy's Neal Station Complex. The results of the study demonstrate that minimal aquatic and ecological impacts result when CWIS are properly sited, designed and operated within appropriate parameters on fresh water rivers.

EPA Response

EPA appreciates the opportunity to review additional studies that evaluate entrainment and impingement impacts for specific facilities. In the case of the George Neal Station located on the Missouri River near Sioux City, Iowa, the study provided states that during the study period of 1972-1982 "degradation of the river channel caused by channelization and above normal flow rates has resulted in the loss of much of the highly productive off-channel aquatic habitat-- a loss that has severely impacted most river life forms." As stated in response to comment 316bNFR.501.015, EPA questions the relevance of low numbers of entrainment or impingement losses within waterbodies that are degraded at the time the study was conducted. In the case of a waterbody or waterbody segment that is impaired, living resources often exhibit diminished numbers and diversity. Because Clean Water Act requirements and state water quality standards are designed to maintain and improve the Nation's waters, degraded waterbodies are subject to restoration efforts that will theoretically result in increased numbers of fish and other aquatic resources as the waterbody returns to more historical, pristine conditions. EPA does not support the argument that it is appropriate to further impact a waterbody once it has been degraded.

Comment ID 316bNFR.534.002

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

MidAmerican Energy commends EPA for considering eliminating the over-generalized and ambiguous term “littoral zone” in favor of an appropriately flexible habitat evaluation system which will account qualitatively on a site-specific basis for the features characteristic of habitat critical to a given aquatic resource.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.534.003

Subject Matter Code 10.011

River/Stream--Proposed Standards

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

MidAmerican is also offering its support for EPA's proposal to reduce the minimum performance standards applicable to new CWIS located on freshwater rivers and streams, in recognition that freshwater river and stream biota are less vulnerable to impingement and entrainment due to unique opportunistic life-history strategies.

EPA Response

See response to comment 316bNFR.524.018 and See 316bNFR502.002 and the preamble to the final rule.

Comment ID 316bNFR.534.004

Subject Matter Code 11.0

Best Technology Available-Location

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

As for EPA's suggested statistical correlation between CWIS and their relative proximity to listed 'impaired waters," MidAmerican Energy urges EPA to acknowledge that no study has yet to demonstrate a causal relationship between CWIS and a §303(d) impairment determination.

EPA Response

EPA recognizes that cooling water intake structures are not the only source of human-induced stress on aquatic communities. While recognizing that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, the Agency identified methods for generally evaluating the stresses on aquatic communities from human-induced perturbations other than fishing. Of particular importance is the recognition that stressors that cause or contribute to the loss of aquatic organisms and habitat may incrementally impact the viability of aquatic resources. EPA has examined whether waters meet their designated uses, whether fisheries are in stress, and whether waters would have improved water quality or better support their designated uses if EPA established additional requirements for new cooling water intake structures. While EPA does not believe this means that CWIS are the sole cause of these problems, it is not reasonable for industry to assert that there are no ecological problems in water bodies where CWIS are located and that CWIS do not add stress to these water bodies. EPA's record shows the converse is true; water bodies need improvement and the CWIS are one stress to these waterbodies.

EPA also recognizes that the data prepared internally by Dabolt, ("Relationship of Location to Cooling Water Intake Structures to Impaired Waters, Memorandum, April 2001) in relation to the location of the CWIS in impaired waters, does not establish that cooling water intake structures are the cause of adverse environmental impact in any particular case, and that there may be other reasons for the presence of impaired waters near cooling water intake structures. Nonetheless, this analysis suggests that many cooling water intake structures are sited within or adjacent to impaired waters, and that intakes may potentially contribute to existing stress on waterbodies and their resident biota.

Comment ID 316bNFR.534.005

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

In its NODA, EPA has specifically invited commenters to submit additional studies that demonstrate a lack of significant impingement and entrainment impacts to aquatic resources (66 Fed. Reg. 28859). MidAmerican Energy is submitting two copies each of the results from the comprehensive long-term aquatic studies prepared for the Neal Generating Complex, located near Sioux City, Iowa on the Missouri River. The facilities are coal-fired utilizing once-through (open) cooling systems. MidAmerican believes this study supports its contention that impingement and entrainment, when viewed from a population, subpopulation or community perspective, does not result in adverse environmental impacts.

Neal Complex Study

Morningside College of Sioux City, Iowa, conducted a 10-year (1972-1982) study of the channelized Missouri River near Sioux City. The results of this study are found in Missouri River Aquatic Ecology Studies, Ten Year Summary (1972-1982), copies of which MidAmerican has included with its commentary.

The comprehensive study focused on the operational effects of MidAmerican Energy's George Neal North and South Stations on Missouri River environmental quality. Morningside found that the Missouri River aquatic environment near the Neal complex had been heavily impacted by channelization and very high flow rates meant to enhance barge traffic and navigation. These changes to the natural river system resulted in significant losses of habitat necessary for spawning, nursery, and feeding. (Neal Study p69)

The comprehensive study consisted of several chemical, physical, hydrological, microbiological, invertebrate and fishery studies that were conducted during this 10-year span. Impingement and entrainment studies were also conducted by Morningside College as part of its overall effort.

The study concluded that operation of the Neal Generation complex had negligible effect on water quality or nearby aquatic communities. The study stated "without exception, the Neal Units 1-3 and Neal Unit 4 were found to have no effect on the chemical and physical parameters studied." (Neal Study, p 17). Fish impingement and entrainment by the CWIS were found to be minimal due to the low number of organisms affected. Invertebrate studies showed that operation of the facility "does not affect the invertebrate populations." (Neal Study, p31) While 52 species of fish were collected in the Neal Station complex area, the river near the Neal stations was dominated by drum, an opportunistic species. The study also found that entrainment of larval fish at Neal was minimal. Likewise, the Morningside College found that impingement had little or no effect on fish populations. "The low impingement rates, the types of fish collected (mostly rough fish) and the small size of the fish impinged, results in a minimal impact to the fish community. (Neal Study, p. 69)."

Morningside College ultimately concluded in its summary:

"The results of this ten year study indicate that little, if any, detrimental impact to the Missouri River ecosystem can be attributed to the operation of George Neal Units 1-4."

EPA Response

See response to comments 316bNFR.501.015 and 316bNFR.534.001.

Comment ID 316bNFR.534.006

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

EPA had proposed to require expansive Best Technology Available (BTA) requirements for the new CWIS development in the "littoral zone" (i.e., shoreline) of freshwater rivers, lakes and reservoir. EPA was essentially using the term littoral zone as a proxy for sensitive biological areas (proposed § 125.83, 65 Fed. Reg. 49116). Recognizing, however, that the term is not consistent with critical habitat, EPA, in its NODA, is considering dispensing with this critical term and adopting terminology to identify individual areas of high potential impact or increased potential vulnerability of fish and invertebrates on a case-by-case or site-specific basis.

MidAmerican Energy strongly supports abandonment of the strict academic concept of "littoral zone" as a critical technological determinative within a broad regulatory framework. The littoral zone simply is not synonymous with critical or sensitive habitat, particularly in swift channelized riverine systems. As we noted in our previous commentary, in large river systems, which include the lower main stem of the Missouri River, the "littoral zone" is heavily influenced by strong flow and often does not support any vegetation, structural diversity or other features which. could qualify as "critical habitat". These relatively barren characteristics are due to the effects of channelization, flood control, turbidity and riverbed degradation.

MidAmerican Energy's studies have supported EPRI's findings that fish and invertebrates are not uniformly distributed within the water column, but are typically concentrated in key habitats, which offer conditions favorable to life support and reproduction. These habitats cannot be generalized from one region or geographical area to another, or from one water body to another, for that matter. Importantly, these critical habitats, which are highly site-specific, are largely known to State and regulatory officials. Such critical habitat can easily be protected without rewriting to an inappropriate hierarchy of ambiguous and over-generalized academic concepts. MidAmerican strongly urges EPA to adopt the use of concepts such as "zones of productivity" or "areas of high impact" when devising its protective scheme. These terms are functionally preferable, and ecologically more relevant to any given water body and are more attuned to the laudable goal of protecting areas truly sensitive to impingement and entrainment.

EPA Response

EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody.

Comment ID 316bNFR.534.007

Subject Matter Code 10.011

River/Stream--Proposed Standards

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

In the NODA, EPA considers whether the aquatic species predominant in freshwater rivers and streams have reproductive and life history strategies that make them less susceptible to CWIS impacts. (66 Fed. Reg. 28858). MidAmerican Energy agrees that, consistent with our studies, freshwater streams and rivers are relatively insensitive to entrainment and impingement impacts and suggests EPA's original proposal is more restrictive than necessary. Our conclusions are based on the ample existing literature, as well as the results of several impingement and entrainment studies conducted at our generation facilities. EPRI, UWAG and MidAmerican Energy studies all demonstrate the resilience of populations in freshwater environments for most types of fish and invertebrate species.

A vast majority (more than 90%) of the fish impinged and/or entrained at MidAmerican Energy facilities were drum, carp, shad and other species that exhibit opportunistic lifecycle strategies. This is consistent with the literature and the results of other similar aquatic studies. Fish with opportunistic life history strategies exhibit high fecundity, multiple breeding cycles, and short natural life spans. These fish are not commercially harvested, and in fact are often targeted for removal by state fish and wildlife managers, typically with very limited success. The tremendous productivity of these opportunistic species clearly limits their susceptibility to population-level impacts.

On the other hand, in contrast to opportunistic strategists, freshwater equilibrium strategist's eggs, larvae and juveniles are territorial in nature. For example, their eggs are usually associated with or are attached to structure, limiting their exposure to impingement and entrainment. These fish include those generally targeted for recreational sport (bass, perches, catfish). Impingement and entrainment studies conducted at MidAmerican Energy facilities have identified very few instances of impact on these species, even at the individual level. This is due both to these species' territorial nature and due to the appropriate location of the CWIS outside of these species' critical habitat. The concluding discussion on impingement/entrainment in the Missouri River Aquatic Ecology Studies, discussed more fully above, states:

"Open cycle cooling appears to have a minimal effect upon the biota of the channelized Missouri River. Locating the intake structures along the main channel border avoids the more productive quiet water habitat used by fish as spawning and feeding areas."

MidAmerican Energy continues to urge EPA to adopt a site-specific approach to CWIS siting because location will determine which species may be vulnerable to impingement and entrainment, and because different species possess different lifecycle strategies.

EPA Response

See response to comment 316bNFR.524.018.

Comment ID 316bNFR.534.008

Subject Matter Code 11.0

Best Technology Available-Location

Author Name Kevin Eisenbeis

Organization MidAmerican Energy Company

EPA, in its NODA (66 Fed. Reg. 28861) suggests that CWIS are not the only source of anthropomorphic induced stress on aquatic communities. EPA invited comment on its recent study that has been interpreted to suggest the cumulative impacts of impingement and entrainment with "other stress factors" may be a "non-trivial Stress" on a water body. MidAmerican has reviewed this information and believes there is no basis for the suggestion that CWIS impacts may combine with other factors and, cumulatively, push a water body to an "impaired" state. EPA's analysis, prepared internally by Dabolt, ("Relationship of Location to Cooling Water Intake Structures to Impaired Waters, Memorandum, April 2001) purports to identify a statistical correlation between the spatial location of CWIS and waters designated as impaired. In the study, 35% of all intake structures were found to be within two miles of waters listed as impaired (few CWIS themselves are actually located within impaired waters). The reciprocal proposition would seem to be even more remarkable: two-thirds of the 571 CWIS in the study were more than a two-mile distance from waters listed as impaired. In any event, EPA's premise that the proximity of CWIS contributes to impairment is superficial and unsupportable without any additional information regarding the size, design, and operating parameters of the CWIS; the size, type and uses of the water body; the sources and types of pollutants present; and most importantly, the identification of the actual causes of impairment for which the body has been listed by the state.

MidAmerican Energy urges EPA to disregard this questionable line of inquiry, or at the very least further refine the study to address the affects of different pollutant sources, account for additional parameters, and to reconcile the apparent disconnect between 65 percent of the CWIS and non-impaired waters. MidAmerican Energy continues to support EPRI and UWAG studies demonstrating CWIS impacts, whether individual or cumulative, are insignificant and have yet to be found to cause or contribute to the listing of an impaired water.

EPA Response

EPA recognizes that the data prepared internally by Dabolt, ("Relationship of Location to Cooling Water Intake Structures to Impaired Waters, Memorandum, April 2001) in relation to the location of the CWIS in impaired waters, does not establish that cooling water intake structures are the cause of adverse environmental impact in any particular case and that there may be other reasons for the presence of impaired waters near cooling water intake structures. Nonetheless, this analysis suggests that many cooling water intake structures are sited within or adjacent to impaired waters, and that intakes may contribute to existing stress on waterbodies and their resident biota.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Douglas A. Dixon & Kent Zammit

On Behalf Of:

Electric Power Research Institute (EPRI)

Author ID Number:

316bNFR.535

Comment ID 316bNFR.535.001

Subject Matter Code	CP
Comment Period	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

While we appreciate the advance copy of the NODA, there simply was insufficient time to obtain and review all the documents noted in the EPA docket, as well as to comment in detail on all the issues raised, or comments requested, by EPA.

EPA Response

EPA believed that 30 days was sufficient to provide a meaningful opportunity for public comment on the Notice of Data Availability. Nevertheless, on July 6, 2001, EPA published a notice, reopening the comment period for an additional 30 days for certain documents referenced in the Notice of Data Availability.

Moreover, EPA is completing the new facility rule under court order. It is imperative that the rulemaking proceedings be conducted expeditiously. A further extension could have endangered EPA's ability to comply with its obligations to the Court and to the public.

Comment ID 316bNFR.535.002

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.06

Request for Comment: Case-by-Case Framework Approach

Nearly 30 years of research on CWIS impacts and fish protection technologies has indicated that potential impacts and technology effectiveness is a site-specific issue. Historical analysis has also indicated that potential impacts can be avoided by siting intakes in areas where vulnerability to impingement and entrainment processes is low. Aquatic organism life history strategies, life processes and habitat requirements as well as actual impingement and entrainment monitoring results indicate that concepts such as the "littoral zone" and "neritic region of the photic zone" are over-generalizations of habitat requiring protection from CWIS processes. Most states, as a result of biomonitoring and bioassessment programs, have knowledge of critical habitats that support spawning, nursery, and feeding of aquatic organisms. The organisms in these critical habitats would be vulnerable to impingement and entrainment processes and, therefore, siting of CWIS in them should be avoided minimize the potential for environmental impact.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.535.003

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Effective implementation of the rules requires defining "adverse environmental impact" (AEI). EPRI supports the definition -- adverse environmental impact is a reduction in one or more representative indicator species (RIS) that (1) creates an unacceptable risk to a population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function and (2) is attributable to operation of the cooling water intake structure.

EPA Response

Please see response to comment 316bNFR.510.006.

Comment ID 316bNFR.535.004

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Data and tools are available to support siting, to estimate potential impacts, and to assess impacts after operation when unanticipated potential effects may be occurring.

EPA Response

The comment is unclear, overly generalized, and lacks specific context. As such, the Agency was unable to discern the intended context of the issue raised.

Because this comment was listed as one point in a series of key issues raised by the author (and subsequently expounded upon in the comment letter), EPA believes the detailed issue was fully addressed by EPA in other comment responses.

In general, EPA agrees that a variety of tools are available to support intake siting decisions as well as projecting impacts. However, under today's technology-based rule, EPA does not believe that these decisions always need to be made on a case-by-case basis (see responses to comments 316bNFR.014.013, 316bNFR.068.007, 316bNFR.068.008). Also, EPA believes that it is less costly for new facilities to implement design and construction technologies initially, rather than retrofitting at a later date (see response to comment 316bNFR.535.005).

Comment ID 316bNFR.535.005

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Nearly 30 years of historical data and knowledge indicate that CWIS impacts are not occurring, or are extremely small. This affords EPA rulemakers the opportunity to avoid a stance of total aversion to any risk. The 5-year NPDES permit cycle offers further opportunity to address the potential development of unanticipated site-specific problems at new CWIS facilities. Existing and anticipated developments in physical and behavioral technologies that protect aquatic organisms from impingement and entrainment processes can be evaluated and applied to address these potential problems.

EPA Response

EPA strongly disagrees with the commenter's position that nearly 30 years of data indicate that cooling water intake structure impacts are not occurring or are extremely small. To the contrary, EPA has provided extensive data, both in the proposed rule and the NODA, documenting cases where substantial numbers of organisms are impinged and entrained by cooling water intakes.

EPA analyses suggest that more than 99 percent of surveyed existing cooling water withdrawal facilities are located within 2 miles of waters that are identified as impaired and listed by a State of Tribe as needing development of a total maximum daily load (TMDL). This suggests that cooling water intakes may be a contributing factor to existing stresses on water bodies and resident biota.

EPA is also concerned that extensive data sets, encompassing 20 or more years of data, may be required to adequately assess whether or not populations are being affected by intakes. Under such circumstances a precautionary approach is warranted. EPA would note that states such as New York, which have developed extensive data sets for the Hudson River, believe that cooling water intakes are having an adverse environmental impact on that body of water.

With respect to the commenter's point about the 5 year permit cycle affording an opportunity to confirm that the permit authority has made the right decision, EPA notes that the new facility permitting decision is particularly important. This is because it is least costly to decide to require certain controls before the plant is built rather than afterwards when retrofitting costs may prevent the same technology from being economically practicable. This favors making a decision to require technologies that represent best technology available for minimizing adverse environmental impact before the facility is installed rather than after it is installed.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.535.006

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 13.1

Requirement of 0.5 fps

Approach velocity is only one of the parameters controlling impingement. Although fish swim speed data supplied by EPRI suggests that 0.5-fps is protective, these data were obtained from fish used in experimental chambers. Because of the experimental stress applied to test organisms, the data is an extremely conservative representation of fish swimming abilities in the natural environment. Also, not all fish with weak swimming abilities are found at all potential CWIS sites. Additionally, many protective technologies exist that are designed to operate at much higher velocities, such as the EPRI designed Modular Inclined Screen (MIS). We also anticipate continued development of highly effective behavioral technologies (e.g., acoustic, light, modification of flow fields) to minimize impingement. New tools and an increasing understanding of fish behavior in response to their physical environment is leading to these anticipated developments.

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

See response to comment 316bNFR.001.001 for information on the intake configuration.

These data were compiled from over 120 species and represent a broad cross section of fish species, each with different swimming abilities. These data provide a comprehensive basis for the velocity requirement, as a given facility is more likely to be co-located with multiple species, as opposed to limiting the velocity requirements to a single species in a species-specific approach.

See response to comment 316bNFR.524.039 for information on the correlation between fish swim speeds in laboratory versus wild settings.

Comment ID 316bNFR.535.007

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 13.3

Request for Comment: Consideration of Site-specific Determinations

Adoption of a universal approach velocity of less than 1.0-fps may lead to problems associated with biofouling. This issue was not discussed in the EPRI approach velocity study. At low velocities, studies have shown that settlement of biofouling organisms increases dramatically. Biofouling will rapidly eliminate the design approach velocities of screens; i.e., actual velocities will increase. Furthermore, potential addition of biocides to control biofouling will likely lead to increased mortality to entrained eggs, larvae, and early stage juvenile fish as well as discharge of potentially toxic chemicals.

EPA Response

See response to comment 316bNFR.023.008 for information regarding biofouling issues.

See response to comment 316bNFR.206.116 for information on required inspections to maintain clean intakes.

Also see responses to comments 316bNFR.022.002, 316bNFR.022.007, 316bNFR.503.005, 316bNFR.028.031, and 316bNFR.063.010.

Comment ID 316bNFR.535.008

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

The method being used by EPA to determine a regulatory intake volume threshold (2 MGD currently proposed) is subjective. The regulatory threshold should be derived via an analysis of environmental impacts in relation to withdrawal volume. EPRI is currently performing such an analysis and results are anticipated this fall. EPRI presented anecdotal information in our comments on the draft New Facilities Rule that indicates co-existence of healthy and sustainable aquatic communities at significantly higher flow withdrawal rates. EPRI has provided additional preliminary information below to indicate that healthy aquatic communities can co-exist with withdrawal volumes of 500 MGD and higher.

EPA Response

Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

As of the publication of this final rule EPA has not received results of the studies referenced in the comment. For further discussion of these points, see Section VI.A.3 of the preamble to the final rule.

Comment ID 316bNFR.535.009

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPRI questions the need for universal pre-operational baseline monitoring and post-operational impingement and entrainment monitoring. As previously mentioned, most states, as a result of biomonitoring and bioassessment programs, have knowledge of critical habitats that support spawning, nursery, and feeding of aquatic organisms. This knowledge can be used for effective siting of new CWIS in habitats that will not support aquatic organisms with high vulnerability to impingement and entrainment processes. We believe the need for pre-operational baseline monitoring is a site-specific issue. We similarly believe that the need for post-operational impingement and entrainment monitoring is also site-specific. Effective siting with state-of-the art fish protection technologies will reduce the vulnerability of aquatic organisms to impingement and entrainment. Post-operational monitoring could be implemented when there is evidence of unanticipated potential impacts or where habitat restoration has restored aquatic organism populations.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.535.010

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 19.2

Baseline Biological Characterization Study

The limited time available to examine all documents and prepare our comments has precluded us from obtaining and supplying realistic cost estimates for, when necessary, baseline and impingement and entrainment monitoring. Professional experience indicates, however, that EPA's revised cost estimates are still extremely low.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.535.011

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Environmental impacts of dry and wet-cooling towers need further consideration. Impacts include airborne emissions of pollutants, discharge of waterborne contaminants including biocides and toxic chemicals that are concentrated in the recycling process, and potential impacts to insects including indirect impacts to other ecosystem functions. Energy penalties because of cooling inefficiencies require additional power production and associated acquisition of additional fuels, and their extraction and delivery have their own set of potential environmental impacts.

EPA Response

See responses to comments 316bNFR.014.019 and 316bNFR.068.100.

Comment ID 316bNFR.535.012

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

Relative to the previous comment on potential impacts of dry cooling towers on insects, if EPA adopts an AEI definition that involves counts of aquatic organisms, not to do likewise for insects would be arbitrary or highly subjective. Like many fish species commonly impinged and entrained by CWIS that serve as forage to higher trophic level aquatic organisms, insects similarly serve as forage to higher trophic levels. In fact, many species of fish, particularly their early life stages, rely predominantly on insects for food.

EPA Response

See response to comment 316bNFR.056.011.

Comment ID 316bNFR.535.013

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

EPRI, in response to the EPA comment period extension on cooling tower costs and associated energy penalties, will submit comments on this issue on July 25, 2001.

EPA Response

No response necessary.

Comment ID 316bNFR.535.014

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

Relative to the flow withdrawal volume and percentage of industries covered by the criteria of 2 through 100 MGD based on EPA's analysis of the detailed questionnaire, we note that the derivation process is subjective. EPA has not performed the scientific analysis to determine the flow withdrawal volume that may result in an environmental impact and set the criteria accordingly. EPRI is currently funding such a project and we anticipate having results in the final quarter of 2001.

Specifically, our study (being performed by scientists at the Oak Ridge National Laboratory) is examining the relationship between withdrawal volume and environmental impacts. We are examining impacts in relation to, not only thermal plant withdrawals, but withdrawals that occur to support hydroelectric power generation, municipal water supply, and irrigation supply. These additional water withdrawal processes are included because the aquatic environment cannot discern the purpose of the withdrawal. In fact, inclusion of these additional withdrawals will provide a worst-case analysis because, unlike CWIS which is a non-consumptive use with high survival for many fish and invertebrate species (EPRI 2000a), hydroelectric, municipal, and irrigation withdrawals are consumptive uses; i.e., mortality is total relative to the water body withdrawn from.

The analysis being performed with EPRI funding will be similar to the analyses performed by the U.S. Fish and Wildlife Service, National Reservoir Research Program (1963-1975)(Jenkins 1977). This program evaluated the predictive ability of fish biomass, harvest, and predator-prey relations in reservoirs, predominantly in the southeastern U.S. In their analyses, a power plant withdrawal is considered a predator. Some of the results of this research are discussed below in Section II.F.1. Detailed results will be presented in the EPRI report to be delivered this fall.

EPA Response

As of the publication of this final rule EPA has not received results of the studies referenced in the comment. EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Comment ID 316bNFR.535.015

Subject Matter Code	7.41
Request for Comment: Methodology for Determining 2 MGD Threshold	

Author Name Douglas A. Dixon & Kent Zammit
Organization Electric Power Research Institute (EPRI)

EPRI also reminds EPA of a similar national study conducted by the Nuclear Regulatory Commission (NRC 1996) to support relicensing of nuclear power plants. This study was noted in our comments on the draft New Facilities Rule, however, EPA has not noted the research in its NODA. Our comment was as follows:

** In 1996, in preparation for the impending relicensing of nuclear power plants in the U.S., the U.S. Nuclear Regulatory Commission (NRC) published the results of a multi-year study of the generic environmental impacts (NRC 1996). The NRC study explicitly examined the impacts of impingement and entrainment at nuclear plants with once-through cooling water operations. The following are key conclusions of that effort:

- "Although significant adverse entrainment effects have not been demonstrated at most facilities, the entrainment of fish and shellfish in early life stages remains an issue at some nuclear plants with once-through cooling systems."
- "The impacts of fish and shellfish entrainment are small at many plants, but they may be moderate or even large at a few plants with once-through cooling systems."
- "As with entrainment, operational monitoring and mitigative measures have allayed concerns about population-level effects at most plants, but impingement mortality continues to be an issue at others."
- "The impacts of impingement are small at many plants but may be moderate or even large at a few plants with once-through cooling systems."

NRC did not reference any specific population-level impact with regards to plants where impingement and entrainment remains an issue or a concern; in fact, where issues or concerns remain, they were based solely on the subjective opinions of state regulators and resource agencies. The NRC concluded due to unresolved impingement and entrainment issues at some plants that this issue should be dealt with on a site-specific basis during plant relicensing.

Using the NRC database of nuclear plants with once-through cooling, EPRI calculated the average and range of water withdrawal rates for comparison to EPA's proposed design flow rate for new facilities that will be subject to the rules requirements. The NRC database includes 42 nuclear plants with 67 operating units that employ once-through cooling. The average withdrawal per unit is 903 MGD (range of 71 MGD to 1,728 MGD). More importantly, the average withdrawal per water body (i.e., where more than one unit withdraws from a single water body) is 1,140 MGD (range of 71 MGD to 3,456 MGD)(EPRI's database for this analysis is attached). These withdrawals contrast strongly with EPA's proposed criteria of 2 MGD, suggesting that EPA's criteria is overly conservative.

EPA Response

The facilities described are existing facilities not subject to this rule. Requirements for existing facilities will be developed under Phase II and III regulations. EPA also notes that, as discussed in

Section III of the rule, the Agency does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including, but not limited to, assessments of fish and aquatic organism population impacts.

Comment ID 316bNFR.535.016

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

We add the following additional information noted by NRC (1996). NRC also examined the impingement and entrainment impacts of withdrawals associated with cooling tower make-up water. Generally, depending upon location or salt content of water, wet cooling tower withdrawals reduce requisite surface water withdrawals by approximately 90 to 98 percent. NRC did not record make-up flow for plants that employ wet cooling towers; however, a rough approximation can be made by adjusting the average withdrawal per water body for plants with CWIS noted above. Average wet cooling tower withdrawal rates per water body would be between 23 and 114 MGD (range of 1.4 to 69 MGD and 7.1 to 346 MGD depending on salt content of the make-up water). In considering the effects of closed-cycle cooling systems on aquatic organisms, NRC staff evaluated the same issues that were evaluated for open-cycle systems: impingement of fish and shellfish, entrainment of fish and shellfish early life stages, entrainment of phytoplankton and zooplankton, thermal discharge effects, cold shock, effects on movement and distribution of aquatic biota, premature emergence of aquatic insects, stimulation of nuisance organisms, losses of predation, parasitism, disease, gas super-saturation, low dissolved oxygen in the discharge, and accumulation of contaminants in the sediments or biota. NRC (1996) concluded the following:

Based on reviews of literature and operational monitoring reports, consultation with utilities and regulatory agencies, and comments on the draft GEIS, these potential effects have not been shown to cause reductions in aquatic populations near any existing nuclear power plants. None of the regulatory and resource agencies expressed concerns about the cumulative effects on aquatic resources of closed cycle cooling system operations at this time, although some recommended continued monitoring in view of efforts to restore fish populations.

Relative to the final exception noted in their conclusion, NRC also examined potential impacts of closed cycle operation on key fish restoration efforts (e.g., ESA listed salmon and salmon habitat in the Pacific Northwest and anadromous fish in the eastern U.S.). NRC concluded the following:

It is unlikely that the small volumes of water withdrawn and discharged by closed cycle cooling systems would interfere with the future restoration of aquatic biota or their habitats.

EPA Response

EPA adopted closed cycle wet cooling as the technology-basis for the requirements of the rule for the reasons discussed in Section V of the preamble to the final rule.

Comment ID 316bNFR.535.017

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 7.41

Request for Comment: Methodology for Determining 2 MGD Threshold

Albeit based on preliminary anecdotal analyses as discussed in EPRI's comments (November 9, 2000) on the draft New Facilities Rule, the 2 MGD flow criteria proposed by EPA appears to be extremely conservative.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities where its record supports that the requirements are economically practicable and technically available. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated at the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

Comment ID 316bNFR.535.018

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

Tidal Rivers and Estuaries:

EPRI agrees that tidal rivers and estuaries generally support high densities of pelagic fish and aquatic species and that these species are vulnerable to entrainment and impingement. Relative to freshwater environments, tidal rivers and estuaries support a greater presence of fish and invertebrates with opportunistic and periodic life history strategies (see Winemiller and Rose 1992 and D. Dixon memo to EPA file). Species with this life history strategy are typically pelagic and, therefore, vulnerable to CWIS withdrawals. Vulnerability, however, does not automatically equate with population-level impact, as subsequently discussed. Furthermore, not all areas of estuaries and tidal rivers are equally productive; i.e., many areas within them have low productivity such as hypoxic and anoxic zones in deep areas. Our comments associated with this issue are also further discussed below.

Although densities of eggs and larval fish are high in estuaries relative to other water bodies, the larger the density, the lower their survival rates. Survival, therefore, is uniformly negatively density-dependent (Valiela 1984). Furthermore, the rate of growth of young marine fish is lower when the density of the cohort is higher (Valiela 1984). This inverse relationship can prolong the critical period of life and contribute to the increased mortality rate. Theoretically, processes, such as impingement and entrainment, could decrease density and increase larval survival; i.e., lower density decreases competition increasing the growth rate thereby shortening the critical period and lowering natural mortality. More detailed information on density-dependence (compensation) is available in the paper by Rose et al. (in press), a draft of which was provided to EPA along with our comments on the draft New Facilities Rule.

Compensatory density dependence is frequently miss-represented or miss-understood relative to power plant impingement and entrainment impacts. Compensation is not an allocation to any entity for exploitation. Nor is it a process that will necessarily mitigate all impingement and entrainment losses. Compensation is a property of population regulation -- without it, all populations that are exploited would be driven to extinction. Most importantly, the existence of compensation explains, in part, the inability to detect impacts despite long-time series of population data. This latter point is discussed in more detail below relative to experimental design and the efforts toward providing scientific certitude. The goal of fisheries management is to protect the compensatory reserve of a population such that the population is sustainable. When the compensatory reserve is reduced, sustainability declines rapidly and all additional impacts on that population will cause a negative impact. This was clearly demonstrated with the drastic decline of the striped bass population during the 1980s.

Despite 30 years of study of fish population response from impingement and entrainment losses, there is no evidence that power plant impacts alone can reduce a population's compensatory reserve. This is clearly evident for freshwater environments, including cooling ponds (see discussion below) which represent worst-case impact conditions. Impacts in the marine environment are complicated by the co-existence of mortality due to commercial fishing and mortality cause by impingement and entrainment. A direct comparison of mortality, however, indicates there is no comparison -- fishing mortality is more

than an order-of magnitude greater. Despite valiant efforts at controlling fishing mortality, stocks are frequently over-fished depleting a population's compensatory reserve. In the absence of fishing, stocks can rebound in both population size and in rebuilding the requisite compensatory reserve. This is clearly demonstrated with the 10-fold increase in striped bass populations in the Hudson River despite the continued operation of 5 power plants in the Hudson's striped bass spawning and nursery habitat (as well as 13 power plants in the Chesapeake Bay)(Barnthouse 2000; Richkus and McLean 2000). This population increase is not unique to striped bass. Populations of silversides have similarly dramatically increased in the lower Hudson River. Silversides are a common opportunistic estuarine species that provide forage to predatory fish such as striped bass.

EPA Response

The commenter agrees with EPA that estuaries and tidal rivers are generally more productive than other aquatic environments and include many species with pelagic life stages and other life history attribute that make them relatively more vulnerable to impingement and entrainment. The commenter argues that this does not equate to a population-level impact, a conclusion that was not made by EPA and a consideration that EPA believes is irrelevant to the material that it did present in support of the view that estuaries and tidal rivers are particularly sensitive to § 316(b) impacts. EPA also disagrees with the commenter's assertion that these water bodies have "many areas with low productivity….such as hypoxic and anoxic zones in deep oceans." These water body types do not include deep ocean areas, and also do not normally include many zones of oxygen depletion. Anoxic zones in estuaries result for the most part from anthropogenic stressors.

The commenter also argues that if densities of eggs and larvae are higher in estuaries and tidal rivers, then survival rates will be lower because of density-dependence. As discussed elsewhere in these comments, EPA rejects such broad generalizations about compensation and believes that evidence of compensation is necessary when arguing that compensation allows populations to offset intake mortality. EPA also rejects the commenter's argument that impingement and entrainment may actually increase larval survival by decreasing density. This argument might lead to the conclusion that impingement and entrainment actually benefit the ecosystem, an interpretation that is entirely without merit.

The commenter goes on to argue that the operation of compensation helps explain the difficulty in detecting power plant impacts even when long time-series of population data are available. EPA agrees that when density-dependence occurs it tends to stabilize populations even in the presence of anthropogenic stressors. However, EPA reiterates that there are only a few populations subject to impingement and entrainment that show evidence of compensation. This may result from a lack of data as well as numerous factors that can make such processes difficult to detect, including sampling difficulties, the presence of multiple stressors that can interact in complex ways to influence population dynamics, and the high recruitment variability that occurs naturally in most aquatic populations. Further, EPA believes that the decline of winter flounder in Mt. Hope Bay, Massachusetts may result in part from a reduction in compensatory reserve in the face of high rates of entrainment, contrary to the commenter's assertion that there is no such evidence. EPA also notes that the increase in striped bass in the Hudson River referred to by the commenter occurred following a moratorium on fishing and significant water quality improvements, which may contribute to difficulties detecting any

population-level power plant impacts that may occur. See also responses to comments 523.003, 523.102 and 523.103. Please see responses to comments 316bNFR.507.004, 316bNFR.068.015, and section VI.B.2.c of the preamble for additional discussion of population models.

Comment ID 316bNFR.535.019

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Relative to the existence of effective fish protection technologies than those proposed by EPA, the real key to reducing vulnerability for new facilities is proper siting of intakes in areas of low productivity, as further discussed below. Studies of protection technologies at existing plants have demonstrated that effectiveness is a site-specific issue. In some cases, simple and inexpensive barrier nets have proven to be highly effective for reducing impingement, such as the 74 to 94 percent reduction in impingement attained at the Chalk Point Power Plant with a barrier net (Bailey et al. 2000). Increasingly, acoustic technologies have demonstrated high efficiencies for reducing impingement (EPRI 1999a) and further advances are anticipated as research on understanding the response of fish to specific sound frequencies expands (Lambert et al. 1997). For example, Maes et al. (1999) demonstrated that total fish impingement decreased by 51 percent with a new sound system at a nuclear plant intake in Belgium. Most importantly, impingement was reduced by 93 percent for the clupied species (herring and sprat) that are most sensitive due to their lower swimming ability and susceptibility to descaling on intake structures.

In general, advances in development of effective fish protection technologies can be expected. Research is increasingly focusing on the fine-scale relation between fish sensory organs and the signals they receive from the physical environment (Coutant 2001 - in print). Furthermore, new tools, such as computation fluid dynamics (CFD) models, are now available to study the fine-scale nature of hydraulic processes and how fish react to those processes. EPRI has just completed research (EPRI 2001 - in print) using CFD to evaluate the fine-scale flow features around bar racks and louvers intended for fish protection use at hydroelectric plant intakes. Results are allowing us to better refine the physical features of the structures to improve both fish avoidance and guide them to downstream passage facilities.

EPA Response

EPA is not mandating any specific design and construction technologies and is adopting a site-specific approach where facilities have the flexibility to propose technological solutions appropriate for their site conditions where additional controls are needed. The final rule requires facilities withdrawing more than 10 MGD choosing Track I to select and install additional design and construction technologies if they locate in certain areas where fish or shellfish resources need additional protection. Facilities withdrawing between 2 and 10 MGD can choose to follow the Track I requirements but, if they do, they must select and install design and construction technologies at all locations. This allows plenty of scope for advances in the development of effective fish protection technologies in the future.

Comment ID 316bNFR.535.020

Subject Matter Code	11.1
EPA Interpretation of Littoral Zone	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Littoral Zone:

EPRI supports changing the term "littoral zone" to one that identifies areas of high potential impact or high potential vulnerability of fish and invertebrates. As EPRI has previously commented, the littoral zone has different meanings in marine ecology and limnology. Furthermore, while its definition in limnology is relatively precise, this is an academic definition that would be problematic as a regulatory definition. The deep-water boundary of the littoral zone can never be accurately defined as it is subject to hourly, daily, monthly, seasonal and annual movement because of changes in turbidity and substrate morphology. Most importantly, the littoral zone simply is not an area that can be generically defined as supporting fish and invertebrates that are vulnerable to impingement and entrainment. Fish and invertebrates that are pelagic, including their early life stages, are most vulnerable to impingement and entrainment. These organisms are neither randomly nor uniformly spatially distributed; i.e., they are concentrated in key habitats that offer plentiful food, protection from predation and substrate or hydraulic conditions favorable for spawning and recruitment. EPRI is currently preparing a report that reviews information on critical spawning and nursery habitat that is relevant to siting new facilities and for assessing impacts of existing facilities. This report is currently under-going peer review, a final version is expected this August. As soon as this report is completed, EPRI will deliver copies to EPA staff and the 316-b comment docket.

EPA Response

See response to comment 316bNFR.028.023.

Comment ID 316bNFR.535.021

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

We also believe that use of the term "photic zone of the neritic region" is inappropriate. The fact that impingement and entrainment occurs in the photic zone is an over-generalization. Precluding the siting of intakes in areas of high productivity, particularly areas that produce pelagic life stages of fish and invertebrates that are vulnerable to impingement and entrainment is more appropriate, as subsequently discussed. [technical note: in marine ecology and limnology, the depth of light penetration is not the key ecological parameter for determining areas of productivity, as light, albeit at very low levels, will penetrate to extreme depths depending upon turbidity and dissolved solids. The correct parameter of ecological relevance is the compensation depth; i.e., the depth at which respiration equals photosynthesis -- this is also frequently referred to as the critical depth or the depth at which the average light intensity in the water column equals the average compensation light intensity (Valiela 1984). At or below the compensation depth, net productivity is zero.]

EPA Response

EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody.

Comment ID 316bNFR.535.022

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

One of the key findings from historical research on power plant siting to reduce the potential for environmental impact was to avoid placing an intake in an area of high biological value (e.g., spawning, rearing, migration areas)(EPA 1973). Today, as a result of nearly 30 years of water quality investigations and fisheries management studies by state resource and regulatory agencies, habitat requiring protection is well known. In fact, current state biomonitoring programs commonly assess aquatic habitat using a mix of qualitative visual scoring techniques, quantitative physical habitat measurements, and quantitative field sampling for fish and invertebrates (Bauer and Ralph 2001).

EPRI concurs with the theoretical approach for identifying "Habitat Areas of Particular Concern" (HAPCs). This approach is consistent with historical efforts to improve power plant siting and is of relevance to organism vulnerability. Documentation on the HAPC approach, however, is limited. EPRI reserves comment until we have had sufficient time to review the technical details and methodology for identifying HAPCs. The HAPC approach is one of the subjects reviewed in the aforementioned EPRI report in preparation that examines methods for identifying and evaluating the quality of spawning and nursery habitat of relevance to 316(b) assessments.

EPA Response

EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody.

Comment ID 316bNFR.535.024

Subject Matter Code	11.13
Littoral Zone in Tidal Rivers/Estuaries	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Revised definition of estuary and ocean:

The revised definition of estuaries falls short in that it does not define the seaward boundary of the estuary. This is important because EPA's subsequent definition of ocean includes …seaward of the waters defined as estuary waters. In the limited time available, EPRI has reviewed key literature but was unable to locate or identify a conventional definition of either, such that the seaward boundary of estuaries, or the shoreward boundary of oceans, is defined. While the boundary definition could incorporate some element of where measurable dilution with fresh water ends, even this is subject to debate.

While "definitions" may work for academic applications, definitions in a regulatory environment become almost problematic. EPRI noted a similar problem in our comments on the draft New Facilities Rule relative to the "littoral zone", where the term has different definitions depending on the academic aquatic science area (freshwater versus marine ecology). Problems with definitions could be avoided by embracing the site-specific approach to impact assessment; i.e., a conclusion reached in almost all historical CWIS impact assessment efforts, including its recognition by the draft Section 316(b) assessment guidelines released by EPA in 1977.

EPA Response

The definitions of ocean and estuary were developed using guidance from other EPA programs and existing literature sources. Thus the relevant definitions for the rule are as follows :

Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

Tidal river means the most seaward reach of a river or stream where the salinity is typically less than or equal to 0.5 parts per thousand (by mass) at a time of annual low flow and whose surface elevation responds to the effects of coastal lunar tides.

However, after reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements

determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has established a This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.535.025

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 12.22

Potential for Additional Measures for Unique Situations (Great Lakes)

Great Lakes:

The argument that the Great Lakes are more sensitive or vulnerable to CWIS impacts is extremely tenuous; however, that they are physically and biologically different from traditional lakes and reservoirs is not debated. In fact, it could be more effectively argued, both theoretically and practically, that rivers and traditional lakes and reservoirs are more sensitive because of their natural advective features or low retention time and extremely enclosed nature relative to the Great Lakes. The Great Lakes system offers fish populations huge refugia and ecological patches from which to re-colonize areas where losses occur. What is needed to answer this question is a simple analysis of productivity differences between different water body types. In the short-time period allowed to submit comments, we were unable to identify explicit research or summary papers that address this type of analysis, though we believe such information exists.

The Great Lakes system is an extremely complex water body that has been subject to long-term deliberate and accidental perturbations. The community that existed during the 1970s when most of the 316(b) demonstrations (and extremely high impingement episodes) occurred (Michaud 2000), no longer exists. The general ecological community has dramatically changed (Frabrizio et al. 2000; Kitchell et al. 2000) due to both introduction of Pacific salmon and invasion by zebra mussels and other exotic fish. The full extent of the zebra mussel infestation is yet to be realized; however, increased water clarity is dramatic -- this increased clarity is due to reduction in zooplankton and phytoplankton by the filtering action of the mussels. This reduction will likely lead to further reduction in overall productivity of the Lakes, at least in respect to fish communities. The Great Lakes are tremendous visible features on our landscape and considerable national and international attention and energy has been focused on resolution of its problems -- this focus and energy, however, should not necessarily be miss-interpreted that the Lakes are highly productive requiring increased level of fish protection.

Furthermore, following review of the EPA cited Herdendorf (1990) paper, we believe that EPA has miss-interpreted or miss-understood what the author was proposing. Herdendorf explicitly proposes that there are features of the Great Lakes (not the entire system) that are similar to the some of the basic features of estuaries; i.e., semi-enclosed bodies of water where runoff from the land mixes with lake water. These include river mouth areas that discharge into the Lakes or enclosed coves and small bays. Typically, areas where water masses mix (much like a salt wedge in estuaries) are biologically productive due to a number of complex processes that make nutrients available and suspend particulate matter for lower trophic level consumption which in turn attract organisms at high trophic levels. Whether or not these areas should be considered as lacustrine estuaries is an academic exercise. In the same journal as the Herdendorf paper, Schubel and Pritchard (1990) vehemently argue otherwise based on the lack of salt mixing. The first key point is that Herdendorf does not argue that the entire Great Lakes system should be considered an estuary. The second point is, while the areas noted by Herdendorf may be productive due to mixing processes, whether they are more productive than other areas of the upstream river is not known because no analysis has been

preformed, to the best of our knowledge. We do not debate, despite the lack of data to prove, that the mixing zones where runoff water and Great Lake's water mix are more productive than general lake water -- this is physically and biologically intuitive. This latter point, however, argues against the need for greater fish protection requirements in open Great Lakes water environments.

EPA Response

EPA believes today's final rule represents best technology available for minimizing adverse environmental impacts in all waterbody types.

Comment ID 316bNFR.535.026

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 11.11

Littoral Zone in Rivers

Freshwater Rivers and Streams:

The following information is provided to clarify and provide additional technical support relative to the EPRI memorandum provided to EPA (D. Dixon memo to EPA File). The EPRI study on the relationship between flow and environmental impacts (see comment in Section II.A above) will provide detailed information. This report will be available this fall. The EPRI memorandum should have been titled: Ecological Reasons Why Fish and Invertebrates in Freshwater River and Reservoir Ecosystems have Lower Vulnerability to Impingement and Entrainment. However, scientific information also indicates that there is a lower potential for population-level impacts from CWIS operation because of lower vulnerability and the greatly reduced other sources of predation (e.g., harvest).

As discussed in the memorandum, fish and invertebrate species with equilibrium and opportunistic life-history strategies (see Winemiller and Rose 1992) dominate freshwater environments. Equilibrium strategists, including eggs, larvae and juveniles, are generally territorial in nature (or, in the case of eggs, associated with, or attached to, structure), thereby limiting their vulnerability to impingement and entrainment. Fishes with equilibrium life history strategies are generally those targeted for recreational sport (e.g., basses, perches, and catfishes). Fish with opportunistic life history strategies (high fecundity, multiple spawning periods, short life span) are the species (e.g., shads, herrings, smelts, and many minnows) most vulnerable to impingement and entrainment. Generally, these species provide the forage base for recreational sport fish and are not recreationally harvested (and, except as use for bait, there is limited commercial harvest -- with the exception in the Great Lakes).

The tremendous productivity of opportunistic species limits their susceptibility to population-level impacts from impingement and entrainment. EPRI noted one recent management effort (Kim and DeVries 2000) that deliberately attempted, but failed, to selectively remove gizzard shad from an impoundment. Via selective removal of gizzard shad using rotenone in Walker County Lake, AL (>90% removal of all adults and juveniles), they found that within two years of the reduction, their abundance rapidly returned to high levels. Since submittal of our memorandum, we have identified a much more comprehensive demonstration of the resilience of freshwater fish populations. Meronek et al. (1996) evaluated the success of 250 fish control projects, as discussed in 131 peer-reviewed technical papers. Fish control treatments reviewed included chemical applications, physical removal and reservoir drawdown, stocking of predators, and combinations of the above. The overall success rate of these deliberate eradication efforts was less than 50%.

EPRI also recommends that EPA staff review the recent paper by Spiers and Gurney (2001). The authors reviewed new theories in a long researched ecological (drift) paradox; i.e., why are populations persistent in linear habitats such as streams, rivers, and estuaries? Restated, if populations are subjected to downstream drift (which is a "withdrawal") as the only transport process, extinction would be inevitable. Their persistence indicates that other processes are active to avoid extinction. The authors reviewed how others have postulated local density-dependent population regulation as an

essential mechanism in the resolution of the paradox; i.e., areas subjected to greater losses from drift (withdrawal) will experience a higher rate of population increase. Spiers and Gurney (2000) furthered the analysis by discussing previous work on the importance of refugia as providing sources of re-colonization, particularly following periods of exceptionally high river discharge. More importantly, the authors, using a series of analytical and numerical models representing a range of hydrodynamic scenarios, demonstrate that the action of diffusive dispersal (random movements from important refugia and spawning, nursery, and rearing habitat) can permit persistence in an advective environment. Their research results also demonstrate the importance of protecting critical habitat that is the source of diffusive processes.

The above additional data demonstrates the resilience of populations in freshwater environments. More importantly, it demonstrates why it is so difficult to demonstrate population-level impacts associated with even large losses of organisms because of power plant impingement and entrainment mortality. The issue of demonstrating a lack of impacts with scientific certitude is further discussed in Section II.E.1 below.

EPA Response

After reviewing the available data and comments, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined littoral zone or zone of higher productivity or sensitivity within certain types of waterbody. Definitional problems and potential implementation complexities were resolved by adopting a two-track approach for new facilities. EPA has promulgated technology-based performance requirements for new facilities that implement the most stringent requirements determined to be best technology available for minimizing adverse environmental impact in all waterbody types. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate comparable performance in a given waterbody in reducing impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.535.027

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Additional Impingement, Entrainment and Mortality Data:

EPRI has previous commented that we recommend the definition of AEI be based on population and community-level impacts that are measurable and of consequence to water resource management. Furthermore, we submit that any definition more conservative than this (e.g., impingement and entrainment counts, impingement and entrainment that is recurring and nontrivial) lacks a scientific foundation and may unnecessarily burden the general public and private industry with actions that provide an unknown environmental benefit. Additional comments on the definition of AEI are discussed in the subsequent section.

EPA Response

Please see response to comment 316bNFR.507.004.

Comment ID 316bNFR.535.028

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

Relative to EPA's discussion on conditional mortality rates (CMR), EPRI does not take exception with the information in the primer identified in the NODA. We add, however, that while estimation of CMRs is a conceptually simple, it requires extensive sampling. As the primer notes, for some species with wide geographical distribution, defining the spatial and temporal scale of sampling is difficult and in many cases problematic. This is a tool that can be used as an early screening tool for existing facilities where available evidence indicates that there may be a potential impact on a species of management concern. Estimation results may be used to determine that no AEI is occurring or if additional analyses are required to reach a definitive decision on the existence of AEI. We do not believe, because of its limitations, that estimated CMRs could be used to determine AEI. Most importantly, because of the need for extensive field, impingement, and entrainment monitoring, including estimation of mortality, that it is a procedure amenable to siting and permitting new facilities.

As the EPA primer notes, CMR estimations are limited in that they explicitly exclude compensatory response. Despite, as EPA notes, that "high" CMRs have been estimated due to power plant impingement and entrainment mortality on the Hudson River, the striped bass population has increased 10-fold since the early 1990s. A similar dramatic increase has also occurred for Atlantic silversides, a common opportunistic forage species for predatory fish such as striped bass.

EPA Response

EPA notes that the sampling difficulties that the commenter argues are associated with estimating conditional mortality rates are common to most assessments of biological populations. Such difficulties, and the costs associated with conducting extensive sampling of populations, are major reasons why EPA has chosen to develop a technology-based rule for new facilities. In an effort to avoid unreasonable costs and delays in the permitting of new facilities, while also protecting aquatic resources from unacceptable or unanticipated risks, EPA’s New Facility Rule requires new facilities to adopt measures to minimize impingement and entrainment to the extent that is economically practical and achievable with available technologies.

Regarding the commenter’s remarks about compensation, see responses to comments 523.003, 523.102, and 523.103.

Comment ID 316bNFR.535.029

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Assessment of Population Modeling Approach:

EPRI has previously commented that Environmental Impact (EI) should be defined as a population or community level consequence. Adversity should be determined within the desired management context for a species or community. The potential definition noted by EPA -- Adverse environmental impact is a reduction in one or more representative indicator species (RIS) that (1) creates an unacceptable risk to a population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function and (2) is attributable to operation of the cooling water intake structure was developed by the Utility Water Act Group (UWAG) with EPRI technical support. In addition, an independent committee of technical experts on fish protection issues organized by EPRI at the request of UWAG has reviewed and concurred with this definition.

EPRI believes that a definition is essential for effective development of the regulations and we also understand that the definition is contentious. We have convened a technical symposium to discuss the AEI definition, including measurement endpoints and approaches for their assessment. All major stakeholder groups will participate in this symposium which will held August 21, 2001 in association with the Annual Meeting of the American Fisheries Society (AFS) in Phoenix, AZ.

EPA Response

Please see response to comment 316bNFR.510.006.

Comment ID 316bNFR.535.030

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

A long-term problem that has existed relative to reaching decisions on the occurrence of environmental impact is the need by many stakeholders of proof that an impact is not occurring. This proof, however, is experimentally impossible. In experimental design and analysis, the initial hypothesis, or null, is that there is no effect or nothing is going on. The alternative hypothesis is that an effect is occurring or present. Scientists cannot prove the null hypothesis -- it can only be rejected leaving one to accept the alternative hypothesis. Failure to reject the null hypothesis can be the result of many reasons including (assuming a valid experimental design):

** Lack of statistical power to detect the effect of interest due to natural variability and sampling error (for comprehensive, long-term time-series data this includes a weak effect)
** No effect (e.g., as a result of compensatory processes).

As has been discussed at EPA public meetings, despite the existence of 25 years of comprehensive time-series data for the Hudson River fish stocks and power plants, a population-level effect cannot be detected, possibly for any of the reasons previously noted. Whatever the reason, if an effect exists, few fisheries biologists would argue that the effect is very small. Therefore, the EPA-expected benefits associated with the elimination of CWIS impacts would similarly be very small. In fact, as previously discussed, on a site-specific basis, elimination of CWIS may have detrimental effects on the aquatic community. As further discussed below, thermal discharges in many locations can extend (or accelerate) the growing season for many species of fish, thereby, increasing survival and recruitment. Reductions in larval density due to power plant entrainment mortality can also increase survival of those that remain in the ambient environment because of decreased competition for food.

The previous discussion is not intended to illustrate the futility in population-level analysis but the futility in attempting to prove the null hypothesis. The null hypothesis and classical experimental design and analysis may not be appropriate for reaching informed decisions. Alternative decision frameworks and methods are available for making informed decisions. Many methods, as reviewed by EPRI (1999b), can be used to make population-level impact decisions using both retrospective (historical data) and predictive (modeling) approaches. All the methods have uncertainties and many of them (e.g., risk prediction models) explicitly incorporate them to aid the decision-making process. Relative to the aforementioned Hudson River time-series and a long-term measured mean CMR (11%), EPRI has preliminarily estimated, using risk assessment modeling, that the risk of a 50% reduction in the population of striped bass during a five-year permit cycle is less than 1% greater than the same natural background risk of decline. Given this estimate, it is not surprising that a population-level effect cannot be detected in the time-series data.

EPA Response

The commenter argues that it is impossible to prove the null hypothesis that an intake-related impact is not occurring. EPA notes that while it is not impossible to demonstrate no effect, adequate testing of

the null hypothesis of no effect will generally require ongoing monitoring. EPA also wishes to clarify a misunderstanding of the scientific method that is implied by this comment. The scientific method involves testing of the null hypothesis that there is no effect related to a phenomenon under investigation. Science does not attempt to "prove the null hypothesis." In testing the null hypothesis, two types of errors are possible. So-called Type I error involves rejecting the null hypothesis of no effect and concluding that there is an effect when in fact none exists. Type II error involves accepting the null hypothesis that there is no effect when in fact an effect exists. In a 1998 article in Science, the marine ecologist Paul Dayton noted that the environmental consequences of a Type II error are generally more serious because ecosystem recovery from anthropogenic stressors is often protracted, while the consequences of a Type I error are generally limited to short-term economic costs.

Comment ID 316bNFR.535.031

Subject Matter Code MISC

Miscellaneous Comment

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Since promulgation of the Clean Water Act including Section 316(b), a wealth of data beyond the expectations of fishery biologists of the 1970s now exists. This body of data indicates that significant impacts from CWIS operation have not been documented. Detailed scientific analysis has indicated that impacts are more a social than technical issue and these impacts are most effectively addressed on a site-specific basis. The social context of CWIS impacts is why standard experimental design and analysis is not appropriate. However, the wealth of data and available methods and models for assessing potential impacts can still be used to reach informed decisions.

Reaching informed decisions requires collaboration among all stakeholders. The EPA Ecological Risk Assessment (ERA) process is a framework that could be used for reaching an informed decision. Other decision analysis frameworks are also available. EPRI is currently working on developing the EPA ERA framework for application to 316(b) assessments. We expect to publish the report in late 2001. We believe, however, that this framework is most appropriate for reaching informed decisions for existing facilities. For new facilities, the focus should be on siting them in areas where the vulnerability of organism impingement and entrainment is expected to be low.

EPA Response

EPA considered an industry two-track approach where the applicant could demonstrate to the permitting agency, on the basis of site-specific studies, either that the proposed intake would not create an appreciable risk of adverse environmental impact or, if it would create an appreciable risk of adverse environmental impact, that the applicant would install technology to “minimize” adverse environmental impact. While EPA is adopting the general two-track framework suggested by a trade association representing the electric generating industry, EPA is not accepting all aspects of this approach. One of the differences is that the final two-track approach contains a different way of measuring equivalence with the environmental performance of the “fast track” in the second track rather than the suggested risk approach. In short, EPA prefers a more concrete and objective measure of best technology available for minimizing adverse environmental impact for the new facility rule than does the measure suggested by the industry proposal. However, EPA did use EPA’s ecological risk assessment guidelines to interpret the term adverse environmental impact. EPA believes, consistent with EPA’s ecological risk assessment guidelines, that it is reasonable to interpret adverse environmental impacts as a range of impacts, including impingement and entrainment, diminishment of compensatory reserve, stresses to the population or ecosystem, harm to threatened or endangered species, and impairment of State or authorized Tribal water quality standards.

EPA agrees that one of the advantages that new facilities have is to site in areas where the vulnerability of organism impingement and entrainment is expected to be low. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature

of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

Comment ID 316bNFR.535.032

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

Biological Assessment Approach:

EPRI believes that EPA's NODA discussion accurately captures technical issues associated with bioassessment and biocriteria. Relative to new CWIS facilities planned for freshwater rivers, lakes and reservoirs, the habitat and fish community information collected by states in their bioassessment programs could be used to support the siting process. This information precludes the need for baseline source water characterization studies, as discussed below. For existing facilities, biocriteria results that indicate a healthy aquatic community also would indicate that CWIS impacts are not occurring. When biocriteria results indicate water body impairment, proper dissection and analysis of inclusive metrics (e.g., those included in the Index of Biotic Integrity or TVA's Reservoir Fish Assemblage Index or RFAI) can provide information on potential CWIS contribution to the impairment. Assignment of actual cause of water body impairment, however, is still a developing science. Extensive work is required before bioassessment can be used for fish communities, if at all, in large open systems such as the Great Lakes, estuaries, and oceans. Alternative forms of data (e.g., surveys of juvenile abundance, surveys to identify Habitat Areas of Particular Concern (HAPC), and other forms of fishery independent and dependent data) are available to support the New Facility siting process.

EPA Response

Please see response to comment 316bNFR.511.005 and section VI.B.2.d of the preamble to today's rule.

Comment ID 316bNFR.535.033

Subject Matter Code	11.0
Best Technology Available-Location	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Additional Information Supporting that I & E May be Non-Trivial Stress on a Waterbody:

We have reviewed the information presented and believe EPA has miss-interpreted that information to conclude that …impingement and entrainment, in combination with other factors, may be a non-trivial stress on a waterbody. In fact, we believe that some of the analyses performed by EPA, most notably the assessment conducted by Dabolt, reinforce previous comments submitted by EPRI on the draft new facilities rule. In those comments, EPRI noted that:

EPA, in its own biannual report to Congress on the quality of our nation's water, has never identified cooling water intake structures as a source of water quality impairment. Searches of the 1998 Report to Congress, specifically the Executive Summary, Chapter 3 (Streams and Rivers), Chapter 4 (Lakes and Reservoirs), Chapter 5 (Coastal Resources including Estuaries and Coastal Oceans), and Chapter 8 (Aquatic Life Concerns) for the key words cooling water intake structure, impingement, entrainment and water withdrawals are not found. It is apparent, therefore, that the states do not consider CWIS operation as a water quality or aquatic life impairment of concern.

The fact that 35 percent of existing CWIS are located within 2 miles of locations within water bodies identified as impaired, means that 65 percent of existing CWIS are located on unimpaired waters. The percentage on unimpaired waters is actually higher because the EPA data are not for those facilities in impaired waters but within 2 miles of them. Furthermore, for water bodies impaired, we know from the Biannual Report to Congress that these water bodies are impaired for reasons (e.g., sediment, nutrients, pathogens, dissolved oxygen, metals, pesticides, habitat) other than the presence of the CWIS.

EPA Response

EPA recognizes that the data prepared internally by Dabolt, ("Relationship of Location to Cooling Water Intake Structures to Impaired Waters, Memorandum, April 2001) in relation to the location of the CWIS in impaired waters, does not establish that cooling water intake structures are the cause of adverse environmental impact in any particular case, and that there may be other reasons for the presence of impaired waters near cooling water intake structures. Nonetheless, this analysis suggests that many cooling water intake structures are sited within or adjacent to impaired waters, and that intakes may contribute to existing stress on waterbodies and their resident biota.

EPA also acknowledges that cooling water intake structures are not the only source of human-induced stress on aquatic communities. While recognizing that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, the Agency identified methods for generally evaluating the stresses on aquatic communities from human-induced perturbations other than fishing. Of particular importance is the recognition that stressors that cause or contribute to the loss of aquatic organisms and habitat may incrementally impact the viability of

aquatic resources. EPA has examined whether waters meet their designated uses, whether fisheries are in stress, and whether waters would have improved water quality or better support their designated uses if EPA established additional requirements for new cooling water intake structures. While EPA does not believe this means that CWIS are the sole cause of these problems, it is not reasonable for industry to assert that there are no ecological problems in water bodies where CWIS are located and that CWIS do not add stress to these water bodies. EPA's record shows the converse is true; water bodies need improvement and the CWIS are one stress to these waterbodies.

Comment ID 316bNFR.535.034

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPA's NODA states: In addition, NOAA documents in a number of their Fishery Management Plans that cooling water intake structures, and in particular once-through cooling water systems that withdraw large volumes of water, cause adverse environmental impacts due to significant impingement of juveniles and entrainment of eggs and larvae. EPRI has reviewed the listed management plans and note that the conclusions reached by NOAA are subjective and not supported by any form of technical analysis. In particular, EPA reference item 2-024M is the only document that provides "reference" to support the statement that nuclear plants cause major adverse impact due to the use of cooling water. Their on-line citation is Hill (1996). EPRI has obtained the full reference and reviewed it. The paper deals with Environmental Considerations in Licensing Hydropower Projects: Policies and Practices at the Federal Energy Regulatory Commission -- nuclear plants and once-through cooling impacts are not discussed in this paper.

EPA Response

NOAA is the federal agency responsible for developing Fishery Management Plans. EPA believes that NOAA is in the best position to determine what stressors it wishes to identify within its management plans. EPA is willing to accept NOAA's position regarding the concerns NOAA has about the impacts that cooling water intakes are having on fishery resources. As the Agency has stated in the Preamble and elsewhere in the Response to Comments, EPA believes that cooling water intakes are a stress on the fishery resource and the Agency has provided extensive data, both in the proposed rule and the NODA, documenting the substantial mortality related to the effects of cooling water intakes.

With respect to the commenter's concern that hydropower plant water usage is not relevant to once-through cooling impacts, EPA refers the commenter to the comment submitted on November 9, 2000 by the Electric Power Research Institute (EPRI). On the subject of water withdrawals, EPRI stated "the aquatic community does not discern between the water withdrawal use - cooling withdrawals, municipal withdrawals, irrigation withdrawals, hydropower withdrawals, and instream flow withdrawals all have the same potential for an impact on the water body from which the withdrawal occurs." EPA believes that EPRI has made a worthwhile point - that water withdrawals by other facilities, including hydropower facilities can, like cooling water withdrawals, have an impact on the water body from which the withdrawal occurs. Similar to EPRI, EPA believes that hydropower withdrawals are a legitimate analog to cooling water withdrawals.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comments 316b.NFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.535.035

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.04

Site-specific Permit Flexibility

EPRI further notes that the Atlantic States Marine Fisheries Commission (ASFMC) has only recently launched an initiative to examine the cumulative impacts of power plant impingement and entrainment on fish stocks of commercial interest. The purpose of this study is to determine whether impacts are of a level of significance such that power-plant-induced mortality should be considered separately when developing Fishery Management Plans. Currently, power plant-induced mortality is considered as part of natural mortality. This initiative is in its very early phase; i.e., expert panelist's are determining the population-level tools and approach to perform the analysis. Results of the research are not expected, at the earliest, before the end of 2002.

Based on the scope (cumulative impacts) and objective of the ASMFC initiative, one can conclude that ASMFC has determined that, individually, power-plant impacts cause insignificant impacts on managed fish stocks. This conclusion appears reasonable because, as EPRI has previously commented on to EPA, the Maryland Power Plant Research Program (M-PPRP) has concluded, as a result of long-term research in the Chesapeake Bay, "…that while operations of individual power plants impact various ecosystem elements in various ways, those impacts, taken together, have had no identifiable substantive cumulative impact on Maryland's aquatic resources to date" (M-PPRP 1999 and Richkus and McLean 2000 in Dixon et al. 2000). Thirteen power plants, withdrawing and discharging 8 billion gallons per day of the Bay's waters for cooling purposes, are located on the mainstem of the Bay.

EPA Response

Although EPA acknowledges that MD-PRPP found no substantive cumulative impacts from cooling water intakes of multiple facilities, EPA notes that few such assessments have been made to date. In most cases, 316(b) demonstrations were made on a facility-by-facility basis. EPA further notes that concerns have been expressed over declines in fishery populations caused by multiple intakes. Specifically, member states of the Atlantic States Marine Fisheries Commission have requested a study of the cumulative effects of cooling water intakes on winter flounder abundances (see preamble section VI.B.2.c). For these reasons, EPA is concerned about the potential for multiple cooling water intakes to cause cumulative stressors to fish and shellfish populations and does not believe that one assessment indicating otherwise can form a reasonable basis for disregarding the potential for cumulative effects.

Comment ID 316bNFR.535.036

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code CP

Comment Period

EPRI also notes that EPA lists 22 State and Federal NPDES Permit decision documents in the NODA. Each of these documents can be multi-volume and contain thousands of pages of information and analyses. It is virtually impossible to obtain and review each of these documents during the comment period.

EPA Response

See response to comment 316bNFR.535.001. These documents were included because they are generally relevant to the rule; however, reviewing each of these documents was not necessary for the commenter to comment on the appropriate regulatory framework for new facilities.

Comment ID 316bNFR.535.037

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

EPRI notes and does not debate the fact that 46 percent of fishery stocks known to rely on tidal rivers, estuaries and oceans for spawning, nursery and adult habitat are over-utilized. We are very much concerned with this extent of over-utilization and probable depletion of compensatory reserve. Few fisheries biologist, however, would debate that this over-utilization is overwhelmingly the result of over-harvest of adult stocks. EPRI has performed analyses (to be published in late 2001) that demonstrate for the 5 operating power plants on the lower Hudson River, based on conditional mortality rates (which exclude density dependence), that the cumulative risk of a 50 percent reduction in the current stock of striped bass is less than 1% during a five-year permit cycle. Recovery of the nearly half of our fishery stocks will most benefit from efforts that limit habitat degradation resulting from point and nonpoint source pollutants and physical disruption of habitat due to development, and efforts to control over-harvest and habitat destruction that result from harvest.

EPA Response

EPA agrees with the commenter that fishery stocks are under intense pressures and subject to many different sources of stress. EPA wishes to point out that while it recognizes that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, the Agency identified methods for evaluating more generally the stresses on aquatic communities from human-induced perturbations other than fishing. Of particular importance is the recognition that stressors which cause or contribute to the loss of aquatic organisms and habitat may incrementally impact the viability of aquatic resources.

EPA agrees that limiting stressors such as over-harvesting and habitat destruction is an important part of an overall effort to assure a healthy aquatic ecosystem, nevertheless, these are not the only sources of stress on aquatic resources. EPA has provided extensive data, both in the proposed rule and the NODA, documenting the substantial mortality related to the effects of cooling water intakes. Today's rule is an effort to make progress on reducing mortality from that stressor.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comments 316b.NFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the preamble.

Comment ID 316bNFR.535.038

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 9.42

Considered Definitions of AEI (1,2,3,4)

Other Options for Determining AEI:

EPRI's recommended definition of AEI has been previously discussed. Relative to EPA's possible use of the term "recurring and non trivial", we have previously commented that this definition is arbitrary, subjective, and will likely lead to extensive scientific and stakeholder debate. Relative to EPA's proposed clarification, we believe that this is a policy issue and do not submit a comment.

EPA Response

Please see response to comment 316bNFR.536.013.

Comment ID 316bNFR.535.039

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 12.11

5% Mean Annual Flow

Proportional Flow Limits for Freshwater Streams and Rivers and Tidal Rivers, Estuaries:

EPRI submits, consistent with historical research and recommendations of experts (NAE 1972; EPA 1973), that siting intakes in areas where impingement and entrainment vulnerability of aquatic organisms will be low can minimize the potential for environmental impacts. Since these recommendations were developed, considerably more information is available on aquatic habitat quality and distribution and density of aquatic organisms to support informed decision-making on intake siting. Proportional flow limits are an alternative to effective siting. The 5% of mean annual flow of freshwater streams and rivers appear protective; however, we prefer to wait on the results of our ongoing research on the relation between flow and environmental impacts before submitting a more definitive statement. The proposed 1% of the tidal excursion flow withdrawal limit for tidal rivers and estuaries requires further study.

EPA Response

EPA believes the proportional flow requirements are only part of a comprehensive approach to protecting the aquatic health of a source waterbody. EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

EPA appreciates any further studies the commenter may wish to submit.

Comment ID 316bNFR.535.040

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 12.11

5% Mean Annual Flow

EPRI's ongoing research is explicitly examining the relationship between water withdrawal and environmental impacts. The report on this research will be available in fall 2001. One of the databases we intend to evaluate in detail is the information collected in the National Reservoir Research Program (1963 to ~ 1978)(Jenkins 1977). The primary aim of this program was to seek statistically significant relationships between fish standing crop and harvest with such variables as reservoir area, age, mean and maximum depth, water level fluctuation, outlet depth and withdrawal, thermocline depth, growing season length, total dissolved solids, shore development, and storage ratio. 166 reservoirs were included in the study, all but six lying south of the Mason-Dixon Line and east of 100°W longitude (approximately east of the Rocky Mountains). While our analysis is ongoing, we offer the following preliminary results of data analysis in relation to power plant impacts, as reported by Jenkins (1977).

Jenkins divided the data set into four reservoir types:

1. Hydropower mainstream reservoirs (NOTE: withdrawal in these reservoirs is essentially 100% of the net flow and "mortality" of organisms relative to the water body withdrawn from is 100% - the storage ratio factor used by Jenkins for this category was less than 0.165)
2. Hydropower storage reservoirs
3. Non-hydropower reservoirs further subdivided according to the prevalent chemical type of in-flowing streams (see Jenkins for details)

The following were key preliminary conclusions:

-Comparison of standing crop (kg of fish per hectare) for the four reservoir types showed that hydropower reservoirs had the highest values followed by non-hydropower chemical type 1 or 3, hydropower storage, and non-hydropower chemical type 2 or 4. Relative to these results, Jenkins noted that in a similar separate study of 23 southern reservoirs, a high positive correlation between standing crop and the quantity of water released (or withdrawn) was found.
-Because clupeids (shads) are the fishes most frequently impinged and entrained at southern power plants and make up 40 to 55% of the biomass in cove samples, regressions were also calculated for the four subsamples. Again, standing crop of clupeids was highest for the hydropower mainstream reservoirs and the order was the same for non-clupeid fish.
-Jenkins postulated, in accordance with other research, that the total quantity of nutrients passing through a reservoir appears to be of greater importance to fish production than the concentration of nutrients per unit of volume.

Jenkins performed a more detailed evaluation of one reservoir, Lake Keowee in South Carolina, which supports both hydropower pump storage and a nuclear power plant. Nuclear plant operations began in 1973 and threadfin shad were stocked in 1974. Total available prey crops varied from 20 to 25 kg/ha in 1974-76, but predator crops declined from 19 kg/ha in 1974 to about 6 kg/ha in 1976. Most importantly, the predicted standing crop of threadfin shad, based on the entire hydropower reservoir

storage sample (with limited CWIS withdrawals) was almost exactly the standing crop observed in Lake Keowee. He notes that biologists with Southeast Reservoir Investigations postulate that the apparent decline in predator crop reflected a shift in distribution away from the cove habitats sampled due to increased epilimnial water temperatures. Jenkins and the investigation team concluded, regardless of the cause of the decrease in predator crop, significant decreases in available prey had not occurred.

A similar analysis was performed for Lake Wheeler on which the Browns Ferry Nuclear Plant operates with once-through cooling. The predicted standing crop for Lake Wheeler as derived from 52 hydropower mainstream reservoirs was 275 kg/ha total fish and 130 kg/ha for threadfin shad. Monitoring from 1973 through 1975 found an actual mean total crop of 330 kg/ha and a clupeid crop of 129 kg/ha.

The preceding results indicate, although the results were preliminary and volume of withdrawal not explicitly evaluated, that the withdrawal volume is not a critical factor in determining environmental impact. In fact, the preliminary results demonstrate minimal impact as a result of CWIS withdrawal. EPRI's ongoing analysis will further examine these relationships. We are attempting to gather current standing crop conditions for many of the reservoirs assessed in the program as well as standing crops for reservoirs that currently support municipal, hydropower, and thermal withdrawals.

EPA Response

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See DCN #2-029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN# 2-013L-R15 and 2-013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. EPA disagrees with commenters that other factors influential to impingement and entrainment have been ignored. Both Track I and Track II of the final rule allow for site-specific evaluations in determining the appropriate technologies to be implemented. For example, the Design and Construction Technology Proposal Plan required in Track I and the Evaluation of Potential Cooling Water Intake Structure Effects in Track II allow for site specific consideration of factors other than flow to minimize impacts from impingement and entrainment. Cumulative impacts are addressed on a case-by-case basis by each permitting authority.

EPA expects that this final regulation will reduce impingement and entrainment at new facilities. The final rule establishes requirements that will help preserve aquatic organisms and the ecosystems they inhabit in waters used by cooling water intake structures at new facilities. EPA has considered the potential benefits of the rule; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also

accrue at population, community, or ecosystem levels of ecological structures. The preamble discusses these benefits to the extent possible in qualitative terms.

Comment ID 316bNFR.535.041

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 7.3

Definition: Waters of the US

EPRI also reiterates comments supplied in our response to the EPA draft new facilities rules relative to the quality of fish communities in cooling ponds. Essentially, we believe that cooling ponds represent a worst-case analysis of possible impacts. In our comments we noted:

An example of the type analysis recommended above to ascertain a flow threshold of concern is embodied in studies conducted by EPRI during the 1980s on the sport fishery potential of cooling ponds (EPRI 1986). EPRI studied two cooling ponds in Illinois: (1) Dresden Pond, a partially closed-cycle cooling pond supporting the Dresden Nuclear Plant with a flow withdrawal of 1,421 MGD and (2) Collins Pond, a completely closed system supporting 5, oil-fired peaking units with a flow withdrawal of 1,332 MGD. Both of these ponds essentially represent a worst-case laboratory experiment on the impacts of large withdrawals on populations and aquatic community structure and function. The studied concluded: Walleye, muskellunge, striped bass and hybrid striped bass exhibited excellent growth in Collins Pond as did smallmouth bass in Dresden Pond. One of the primary differences between an open system (such as Dresden Pond) and a closed system (such as Collins Pond) is the potential that the open system has to serve as a fish nursery area for receiving waters (underline is emphasis added in this context). The stocking of "coolwater" species in a closed type system such as Collins Pond is an effective way to control and maintain selected sport fisheries. Dresden Pond was not open to public fishing during this study (and remains closed today), but Collins Pond developed an excellent sport fishery as a result of these stockings. It must be noted that sport fish stocking is required to maintain the fishery (the species stocked are not indigenous nor is there sufficient spawning habitat to naturally maintain the sport fish population). It must be similarly noted that a non-stocked prey population must be sufficiently strong or "healthy" to maintain the observed growth rates and harvest of stocked fish. These two ponds support an average water withdrawal rate of 1,375 MGD.

EPRI supplements the above information with the following additional information relative to fish populations in a cooling pond. In 1980, EPRI evaluated the fishery of Lake Sangchris, an 876-ha cooling lake in central Illinois (EPRI 1980). Comparisons were made by considering various aspects of Lake Sangchris and contemporary data for nearby Lake Shelbyville (with no power plant), other central Illinois reservoirs, and available published literature. Fishery investigations dealt with population dynamics, reproduction, growth, food habits, genetic composition, harvest and fish behavior. The following are the key conclusions reached:

-The fish population and standing crop (kg/ha) in Lake Sangchris was similar to that in other Illinois reservoirs. Furthermore, the standing crop of fish in Lake Sangchris was intermediate between values found for reservoirs of the mid-south and the mid-west. Heated discharge from the power plant provided a longer growing season and different environmental conditions in parts of Lake Sangchris to which several species responded favorably.
-Radiotelemetry studies of fish movements showed that largemouth bass responded seasonally to the thermal gradients. Largemouth bass also exhibited a greater annual growth in the heated area than elsewhere and two other species preferred the heated area during the winter. Largemouth bass and

carp spawned earlier in the heated areas than elsewhere and white bass migrated upstream against the current produced by the power plant and spawned in the discharge canal.
-Mark-recapture estimates indicated a desirable population of largemouth bass that attracted anglers to the lake, especially in the winter.
-Significant biochemical genetic differences were found between largemouth bass populations in Lake Shelbyville and Lake Sangchris, as well as between heated and ambient areas of Lake Sangchris during certain periods of the year.
-Rate of infestation of monogenetic trematodes in bluegills in Lake Shelbyville was significantly greater than in ambient areas of Lake Sangchris.
-Comparison of the fish food resources of Lake Sangchris with those of Lake Shelbyville indicated that any harmful effects of the thermal discharge from the power plant were more than offset by the benefits to the biota.
-The standing crops of phytoplankton, zooplankton, and benthos were greater in Lake Sangchris than in Lake Shelbyville.
-The current produced by the discharge helped maintain more uniform environmental conditions in Lake Sangchris than were possible in Lake Shelbyville where ambient conditions within the water body fluctuated seasonally.

At the time of the study, Kincaid Station, a coal-fired power plant on Lake Sangchris, required 691 MGD when both units were operating at full capacity during the summer. This is approximately 7% of the volume of the lake. EPRI has since calculated the daily percent of volume withdrawal for Collins and Dresden cooling ponds presented in our comments of November 8, 2001 and as re-presented above. The units at Collins Pond withdraw 20% of the pond volume on a daily basis while the units at Dresden Pond daily withdraw 27% of the pond volume.

EPA Response

See Response to Comment 316b.NFR.068.151.

Regarding flow threshold, the final rule seeks to promote use of the best technology available to reduce impingement and entrainment of aquatic organisms. The record contains ample evidence that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. EPA also has determined that a capacity- and location-based limit on withdrawals in certain waterbody types is an achievable requirement that will have little or no impact on the location of cooling water intake structures projected to be built over the next 20 years. See section VI.D of the preamble to the final rule. EPA notes the data offered discuss maintaining and/or stocking sport and prey populations. This rule seeks to reduce environmental impact to waters of the U.S. so that such management is not necessary for such waters.

Finally, EPA believes that fish population impacts in waters of the U.S. are one measure of adverse environmental impact but they are not the only measure. The preamble to the final rule discusses adverse environmental impact as including: impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve;

losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function. See section III and VI.B of the preamble to the final rule.

Comment ID 316bNFR.535.042

Subject Matter Code	12.21
Thermal Stratification	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Limitation on Altering Stratification in Lakes and Reservoirs:

The paper by Chen et al. listed in the NODA was an EPRI Conference pre-print. The paper has since been peer-reviewed and revised in response to technical comments and published (see Chen et al. 2000 in reference section below) in the Journal of Environmental Science & Policy along with numerous other papers presented at the EPRI Conference. EPA has miss-interpreted the information presented in this paper. The simulations of the impoundment indicate that the operation of the power plant cooling system that draws water from depth and releases it on the surface reduces chlorophyll-a concentration in the surface waters. The surface water chlorophyll-a concentration decreases because of a dilution effect of the low concentration of algae in the deep waters. The result is improved aesthetics, where chlorophyll-a concentration is used as an indicator of aesthetics. Furthermore, the cooling water circulation was shown to increase the phosphorus TMDL of the lake, which is an additional benefit.

Strong stratification can sometimes lead to deep-water hypoxic or anoxic conditions, which is harmful to fish and benthic animals. Disturbance of natural stratification is not necessarily bad for an ecosystem. In fact, it is frequently used as a lake management strategy to address eutrophication and low dissolved oxygen issues. It is not possible to generalize about the impacts of stratification disturbance. Impacts may be positive or negative depending on the specifics of the water body, the nature of the disturbance, and the specific ecosystem value or property that is of concern; i.e., it is a site-specific issue. The main focus of this paper was to demonstrate the utility of EPRI's Watershed Analysis Risk Management Framework (WARMF) model. In an ecosystem where there are multiple interacting variables and factors, it is exceedingly difficult to predict ecosystem response using a simple correlation with a single variable; hence, the value of a model such as the one used in the paper.

EPA Response

In the final rule, EPA has included revisions under the proportional flow requirements for lakes and reservoirs, to consider cases where natural stratification does not occur and/or where stratification and turnover may not be ecologically significant. The final rule states that for cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the surface water, except in cases where said disruption is determined to be beneficial to the management of fisheries for fish or shellfish.

Comment ID 316bNFR.535.043

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 13.1

Requirement of 0.5 fps

Velocity:

While a 0.5-fps velocity criteria would appear protective to fish impingement based on the fish swim speed data, EPRI notes that:

-All results are for experimental fish; i.e., fish either artificially reared or removed from the natural environment and subjected to experimental treatment. This process is expected to stress the fish resulting in conservative impingement data. Fish in their natural environment are much more robust and can likely easily react or avoid physical structures at velocities of 1.0 fps.

EPA Response

See response to comment 316bNFR.524.039 for information on the correlation between fish swim speeds in laboratory versus wild settings.

Comment ID 316bNFR.535.044

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 13.1

Requirement of 0.5 fps

Approach velocity is only one of the factors related to impingement. As noted in our report (EPRI 2000a), impingement of fish on CWIS structures is a site-specific issue and other factors that contribute to impingement include the type of species present, intake configuration, local hydraulics, proximity of CWIS to migratory routes and spawning and nursery habitat, and environmental factors that effect fish swimming performance. Since printing of our report, we have identified two additional research reports with valuable information on impingement and its relation (or lack thereof) with plant operational features and environmental factors. Loar et al. (1977) examined threadfin shad impingement data for 32 inland power plants in the southeastern U.S. to identify the factors influencing impingement. Loar et al. concluded that the magnitude of impingement at a given plant could not be related to plant operational parameters such as flow rates and velocities near the intake screens. The effects of intake velocity may possibly be overridden by effects of the temperature regimes to which fish are exposed and also by differences in shad abundance and distribution. Lifton and Storr (1977) also examined impingement data at power plants in Lakes Ontario and Erie in relation to plant operational characteristics and environmental variables. They concluded …the distribution and impingement of fish is related to the effect of a number of environmental variables and diurnal movements. Those factors found to be important were (1) wave height, (2) water temperature, (3) wind direction, (4) sky cover and precipitation, and (5) wind speed. These factors had effects on the impingement of fish at both the onshore and offshore intakes investigated. It was also found that fish may use an offshore intake as shelter; the fish remain on the lee side during high winds.

EPA Response

See response to comment 316bNFR.056.036 for information on the consideration of multiple factors affecting intake velocities.

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Comment ID 316bNFR.535.045

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 13.3

Request for Comment: Consideration of Site-specific Determinations

As discussed in our velocity research report, some intake screen designs require high velocities. EPRI's Modular Inclined Screen (MIS) operates at approach velocities between 1.2 and 3.0 meters per second. The biological effectiveness of the MIS was evaluated in laboratory tests conducted with eleven fish species and in a field evaluation conducted with six fish species. Fish passage survival ranged from 90 to 98 percent in these studies. These studies included blueback herring, a typically fragile clupeid species with poor swimming ability that is exceptionally vulnerable to de-scaling by contact with physical structures (Amaral et al. 2000).

EPA Response

See response to comment 316bNFR.014.018 for general information on the 0.5 ft/s velocity requirement.

Comment ID 316bNFR.535.046

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 13.3

Request for Comment: Consideration of Site-specific Determinations

An additional issue of concern with low approach velocities, not discussed in the EPRI report, is the potential for increased biofouling. EPRI sponsored a project in 1998 to examine non-toxic methods of controlling biofouling formation. As part of that study, we investigated related work in Japan and Europe. Research for the velocity tests found that for most combinations of pipe diameter, materials of construction and configurations, a minimum velocity of 1.4 mps (4.59 fps) was necessary to prevent settlement of most organisms and development of slime (biofilms). As velocities decreased below this threshold, the number and total wet weight of organisms increased logarithmically. Similar biofouling problems can be expected with efforts that aim to increase the CWIS intake area, thereby decreasing the approach velocity. Placement of physical structures to reduce impingement that are distant from an intake pipe will likely experience high biofouling, particularly structures in estuaries where biofouling can be severe.

EPA Response

See response to comment 316bNFR.023.008 for information regarding biofouling issues.

Also see 316bNFR.022.002, 316bNFR.022.007, 316bNFR.503.005, 316bNFR.028.031, and 316bNFR.063.010.

Comment ID 316bNFR.535.047

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 23.3

State Burden and Costs for Permitting Activities

Rule-Making Framework - Burden on States:

The issue of the burden on states is largely a policy issue; however, we note that accepted methods for performing impact assessments are readily available and range from simple screening tools to tools for detailed probabilistic risk assessment (EPRI 1999b). The available tools can be used in an iterative process of increasing complexity depending upon the nature of the problem, documented uncertainties, and the ability to reached AEI and BTA determinations. EPRI is currently funding two efforts designed to ease the process of model/tool selection and for using the tools in a risk assessment framework. The latter effort will specifically develop a potential 316(b)-assessment process according to the EPA Ecological Risk Assessment Framework (EPA 1998). The results of both efforts will be available in EPRI reports in late 2001.

Both reports will also note that, unlike when the Clean Water Act was first promulgated and field data was extremely limited, a wealth of information is now available to perform retrospective type assessments; i.e., assessments based on long-term fisheries population and ecosystem data. These data sets include both fishery-dependent (commercial and recreational CPUE data) and fishery-independent (juvenile indices of abundance, bioassessment) data. These data sets are supplemented by a growing body of information on special habitats of concern requiring a potential increase level of management and protection (e.g., ESA critical habitat, spawning and nursery habitat of recreationally and commercially important species). As previously discussed in Section II.D.2, current state biomonitoring programs commonly assess aquatic habitat using a mix of qualitative visual scoring techniques, quantitative physical habitat measurements, and quantitative field sampling for fish and invertebrates (Bauer and Ralph 2001). Also, as previously discussed, historical research and recommendations of experts (NAE 1972; EPA 1973) have reported that the potential for environmental impacts can be minimized by siting intakes in areas where impingement and entrainment vulnerability of aquatic organisms will be low.

EPRI notes that in public meetings during 1998, 6% of the states vocalized public comment. 10% of the states filed comments on the draft existing source rule and 6% of the states officially participated in the recent EPA Public Meeting (May 23, 2001) on the results of preliminary EPA analyses of the detailed questionnaire data. From a sampling or statistical point of view, this is a limited sample from which to draw inferences or conclusions. As a result of nearly 30 years of water quality investigations and fisheries management since promulgation of NEPA, CWA, and ESA, state resource agencies have developed expert knowledge on the "health" status of their states water resources and the probable cause of major impairment where impairment exists. Direct contact with state resource agency personnel would be a valuable exercise toward better understanding if a population/community level 316(b)-assessment process would be a burden and why.

EPA Response

The final rule has been established to provide States with a framework within which to make more consistent decisions about technology requirements to minimize adverse environmental impacts associated with cooling water intake structures than has occurred under the traditional case-by-case permitting approach. The final rule also retains flexibility for those facilities that wish to demonstrate appropriate site-specific, alternative technologies for minimizing adverse environmental impacts. EPA recognizes the current availability of data and tools for performing impact assessments determining the health status of water resources. EPA expects that these data and tools will be used by facilities to perform site-specific assessments in support of Source Water Baseline Biological Characterizations, Design and Construction Technology Plans, Comprehensive Demonstration Studies, and Evaluations of Potential CWIS Effects, and by States to verify facility-level analyses. In addition, Track I is specifically geared towards the use of existing data to develop the Source Water Baseline Biological Characterization.

In response to the commenter's suggestion that EPA contact additional State agencies to get a better national perspective, EPA believes that it has conducted sufficient outreach activities to satisfy the requirements of section 6 (Consultation) of Executive Order 13132, which concerns Federalism, even though this section does not apply to this rulemaking. In developing the rule, EPA conducted several outreach activities through which State and local officials were informed about the proposed rule and they provided information and comments to the Agency. EPA met with the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). With ASIWPCA's assistance, EPA conducted a conference call in which representatives from 17 States or interstate organizations participated. EPA also held two public meetings to discuss issues related to the rulemaking effort. Representatives from New York and Maryland attended the meetings and provided input to the Agency. EPA also contacted Pennsylvania and Virginia to exchange information. In addition, EPA Regions 1, 3, 4, and 9 served as conduits for transmittal of section 316(b) information between the Agency and several States. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials. Additionally, EPA met with industry, environmental, and State and Federal government representatives to discuss regulatory alternatives for the new facility proposal. A summary of the concerns raised during consultation and EPA's response to those concerns is provided in the record of the final rule.

Comment ID 316bNFR.535.048

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Energy Consumption and Energy Impacts Estimates:

EPRI, in response to the EPA comment period extension on cooling tower costs and associated energy penalties, will submit comments on this issue on July 25, 2001.

EPA Response

No response necessary.

Comment ID 316bNFR.535.049

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Specific Revisions to Inputs to Costing Model for Wet Cooling Towers and Dry Cooling Systems:

EPRI, in response to the EPA comment period extension on cooling tower costs and associated energy penalties, will submit comments on this issue on July 25, 2001.

EPA Response

No response necessary.

Comment ID 316bNFR.535.050

Subject Matter Code	9.46
Request for Comment: Consideration of Nonaquatic Impact	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Other Environmental Impacts:

EPRI believes that EPA has not adequately addressed the environmental impacts of dry and wet cooling. Potential environmental impacts include discharge of airborne particulates and pollutants, waterborne discharge of toxic chemicals to control biofouling and scaling, waterborne discharge of toxic chemicals that are concentrated in blow-down water, and impingement and entrainment of insects with direct and indirect effects on terrestrial and aquatic life. In addition to these direct effects, energy penalties and in-efficiencies of closed-cycle systems will increase air emissions and require additional fuel resource development with its own suite of environmental impacts.

Relative to potential impacts to insects in dry cooling facilities, we are not aware of any study that has explicitly examined them. We note, however, that insects are an extremely important food source for terrestrial and aquatic organisms. In fact, for many species of fish, including their early life stages, insects are the predominant food source. To except/develop a definition of AEI for fish that is less than a population-level impact (e.g., impingement and entrainment counts), yet trivialize potential impacts to insects from dry-cooling without a similar definition, would be extremely arbitrary.

EPA Response

See responses comments 316bNFR.014.019, 316bNFR.056.011, and 316bNFR.068.100.

Comment ID 316bNFR.535.051

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Baseline Biological Characterization Study and Impingement and Entrainment Monitoring during the Permit Term:

As previously discussed in Section II.D.2, current state biomonitoring programs commonly assess aquatic habitat using a mix of qualitative visual scoring techniques, quantitative physical habitat measurements, and quantitative field sampling for fish and invertebrates (Bauer and Ralph 2001). Given this level of knowledge and data, we question the need for universally requiring a baseline biological characterization. We believe the need for additional baseline characterization should be site-specific; i.e., decided by the permitter if necessary to supplement the existing knowledge base.

EPA Response

See Response to Comment 316bNFR.508.014.

Comment ID 316bNFR.535.052

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 20.2

Monitoring Requirements

Based on information previously presented relative to impacts (or lack thereof) from existing facilities, the flow and velocity restrictions, and technology requirements proposed for new facilities, we question the need for universal post-operational impingement and entrainment monitoring. We believe that the need for post-operational monitoring should be determined on a site-specific basis. This need should be based on evidence that an unexpected population- or community-level effect is occurring for unknown cause or there has been a change in habitat use by aquatic organisms due to natural changes in habitat structure or other aquatic habit and population restoration efforts.

EPA Response

EPA disagrees with EPRI and believes that post-operational monitoring is appropriate to minimize impingement and entrainment. The purpose of collecting this data is to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. These data would also be used by the permitting authority in subsequent permit terms to determine whether additional or modified design and construction technologies are reasonably necessary.

In order to prevent extensive and open-ended biological monitoring, which is burdensome and expensive, today's rule adds that, after two years, the Director may approve an applicant's request for less frequent biological monitoring if the facility provides data to support the request showing that less frequent monitoring would still allow for the detection of any seasonal and daily variations in the species and numbers of individuals that are impinged or entrained. The Director should approve a request for reduced frequency in biological monitoring only if the supporting data show that the technologies are consistently performing as projected under all operating and environmental conditions and less frequent monitoring would still allow for the detection of any future performance fluctuations.

Comment ID 316bNFR.535.053

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

We have re-examined the EPA cost estimates for the baseline characterization and entrainment and impingement monitoring. Due to the limited time available for responding to EPA's information request, we have no quantitative data to demonstrate that EPA cost estimates are extremely conservative or, at the level estimated by EPA, would provide information of limited value. Our following comment is based on 25 years of professional experience in conducting and managing environmental sampling programs. At a minimum, multi-species field assessments of any type designed to develop data to support any type of informed decision-making cost $50,000. Entrainment monitoring will cost considerably more because of the time and expertise needed to identify eggs, larvae and juveniles of aquatic organisms. For an estuarine or ocean facility, at a minimum, entrainment monitoring will cost $100,000. These costs exclude analysis of the data to determine population-level impacts or potential impacts. These additional analyses will further increase costs.

EPRI expects that EPA will receive more realistic cost estimates from individual companies currently or recently engaged in impingement and entrainment monitoring. We also expect that UWAG will provide accurate cost data. EPRI defers to the expertise of UWAG and individual companies.

EPA Response

See Response to Comment 316bNFR.525.032.

Comment ID 316bNFR.535.054

Author Name Douglas A. Dixon & Kent Zammit

Organization Electric Power Research Institute (EPRI)

Subject Matter Code 10.16

Two Track Process

Industry Proposal Refining the "Rebuttable Presumption" Regulatory Alternative:

EPRI has no comment on this section except to note that we provided technical information to UWAG to support development of the fast track approach. More importantly, EPRI, at the request of UWAG, has established an independent committee of technical experts on fish protection issues with the responsibility of reviewing and commenting on UWAG documents as they are developed and submitted to the committee. EPRI manages the peer-review process, including collation of all comments and summarizing comments per the committee's approval, and submitting them to UWAG for their consideration

EPA Response

No response necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Michael P. O'Connell

On Behalf Of:

Stoel Rives obo Cogentrix, Inc.

Author ID Number:

316bNFR.536

Comment ID 316bNFR.536.001

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Subject Matter Code 21.2

Electric Generation Sector

The Nation generally and the West specifically have critical needs for new electricity generation facilities. The Administration has acknowledged that one of the most important strategies to solving the Nation's immediate energy shortage is through the addition of new electricity generation resources as soon as practical consistent with protection of natural resources and the environment. Some of provisions of the proposed rule threaten to delay by one or more years permitting for new generation resources using cooling water intake structures and to impose ocher burdens which do not meaningfully protect natural resources arid the environment. At this critical time, that is precisely the wrong approach. We strongly recommend that EPA review the proposed rule to streamline and accelerate permitting for new electrical generating resources.

EPA Response

The commenter cites potential delays as a result of the rule, and implications for future energy supply. See response to comment 316bNFR.512.003.

Comment ID 316bNFR.536.002

Subject Matter Code	10.06
Request for Comment: Case-by-Case Framework Approach	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Cogentrix recommends that any section 316(b) Clean Water Act rule EPA adopts: (1) authorize EPA and state and tribal National Pollutant Discharge Elimination System ("NPDES") program directors to use site-specific considerations at least on a case-by-case basis where national standards and locational attributes do not adequately account for physical and biological factors and impacts which are inherently site specific and/or where the "best technology available" for minimizing adverse impacts also is site-specific; (2) allow for variances on a case-specific basis.

EPA Response

See response to comment 316bNFR.008.007 and the preamble to today's rule.

Comment ID 316bNFR.536.003

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Subject Matter Code 7.3

Definition: Waters of the US

[Cogentrix recommends that any section 316(b) Clean Water Act rule EPA adopts:] (3) define “reservoir’ to exclude constructed basins which have features and characteristics (including creation in areas that have no historic fish or shellfish or that use water which has aheady been screened to exclude significant fish and shellfish resources) that satisfy or overcome the need for application of the section 316(b) national standards and locational attributes to the particular reservoir.

EPA Response

In the final rule EPA has not defined the term "reservoir" to exclude certain constructed basins. Rather, EPA has defined "reservoir" to mean any natural or constructed basin where water is collected and stored. Under the final new facility rule, cooling ponds can be part of a closed-cycle recirculating system. However, in certain circumstances cooling ponds can be defined as "waters of the U.S." if they meet the criteria in the definition of "waters of the U.S." at 40 CFR 122.2. This determination is made on a case-by-case basis. Therefore, the applicability of this rule to any new facility must be determined by the permitting authority.

Comment ID 316bNFR.536.004

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

[Cogentrix recommends that any section 316(b) Clean Water Act rule EPA adopts:] (4) define "adverse environmental effects" in a manner (i) which complies with the due process clause of the Fifth Amendment by providing fair notice of its meaning, (ii) which avoids constitutional questions whether use of an undefined phrase in this context amounts to an unconstitutional delegation or administrative usurpation of legislative power, (iii) which establishes an administrative standard that courts can defer to under United States V. Mead Corp and Chevron U.S.A Inc. vs Natural Resources Defense Council, and (iv) which requires that adverse impacts be "significant" rather exceeding the "recurring and nontrivial" threshold described in the August 20, 2000 Federal Register notice.

EPA Response

EPA is interpreting AEI through notice and comment rulemaking and is publishing our interpretation as part of today's preamble. This meets the requirements of the due process clause. Because AEI is not a regulatory requirement, it is not necessary that it be placed in the regulation.

Please see responses to comments 316bNFR.040.003 (Agency interpretation of AEI) and 316b.NFR.536.011 (delegation and due process issues).

Comment ID 316bNFR.536.005

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

[Cogentrix recommends that any section 316(b) Clean Water Act rule EPA adopts:] (5) phase in the "baseline biological characterization" study requirement (which the proposed ruie requires be submitted one year in advance of NPDES permit application) so that it is not applicable to projects which have NPDES applications pending at the time the rule becomes final.

EPA Response

See response to comment 316bNFR.202.013.

EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicants must conduct a considerably more rigorous study if they seek to demonstrate that alternatives to the Track I requirements will equivalently reduce impingement and entrainment at a site.

The NPDES application process under 40 CFR 122.21 requires that facilities submit information and data 180 days prior to the commencement of a discharge. If you are the owner or operator of a facility that meets the new facility definition, you will be required to submit the information that is required under 40 CFR 122.21 and § 125.86 of today's final rule with your initial permit application and with subsequent applications for permit reissuance. The Director will review the information you provide and will confirm whether your facility is a new facility and establish the appropriate requirements to be applied to the cooling water intake structure(s).

Comment ID 316bNFR.536.006

Subject Matter Code	7.1
Definition: New Facility	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Cogentrix includes this background description of the Facility it proposes to construct at the Mercer Ranch site in order to provide context to the comments set forth below. Cogentrix is not seeking approval through EPA's response to this comment letter of its proposed Mercer Ranch project. Cogentrix reserves the right to modify the Facility as described in this letter as it proceeds with the EFSEC application process.

In August, Cogentrix is planning to submit an application to the Washington Energy Facility Siting Evaluation Council ("EFSEC"), the NPDES permit issuing agency for major energy projects in Washington, seeking a site certification to construct an 850 megawatt gas-fired energy generating facility to be located on a portion of the Mercer Ranch in southcentral Washington State. Mercer Ranch and associated entities currently use water diverted from the Columbia River in accordance with water rights issued in accordance with Washington law. Mercer Ranch diverts water from the Columbia River at a pump station using screens and at flow attraction rates which conform to criteria used by the National Marine Fisheries Service ("NMFS") which protection of salmonids listed under the Endangered Species Act ("ESA") which may be in the area of the Mercer Ranch pump station. All of the water diverted at the Mercer pump station is pumped up approximately 250 feet and distributed for irrigation use by Mercer Ranch and associated entities.

Through an agreement with Mercer Ranch, and subject to obtaining authorizations from EFSEC, Cogentrix will construct a cooling water structure or reservoir of approximately 250 acres within in an area on the Mercer Ranch that was a dry canyon (now described as Double Canyon) before Mercer Ranch commenced irrigation approximately 30 years ago. Prior to Mercer Ranch irrigation, there was no flow in the Double Canyon except in immediate response to significant storm events. Irrigation return flow of approximately 0.7 cubic feet per second ("cfs") to 1.3 cfs now exists in the canyon. These irrigation return flows have high temperature due to the limited vegetation, adjacent to the irrigation return flow channel and have high agricultural constituents inconsistent with maintenance of socially, recreationally or commercially important fish life in Double Canyon. We have assumed for purposes of this letter only that the irrigation return flow and episodic storm flows in Double Canyon would be considered waters of the United States because they eventually flow into the Columbia River. We also assume for purposes of this letter that Cogentrix will seek and obtain a permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act to fill the channel where the irrigation return flow occurs and any other fill of jurisdictional wetlands required for project purposes.

Because the location for construction of the proposed cooling water reservoir historically was a dry canyon, no fish or shellfish are indigenous to the cooling water reservoir location. No saimonids use the area where the cooling water reservoir will be constructed. Surveys conducted by an independent consultant have identified limited use of the area where the reservoir will be constructed by stickleback fish and possible dace or shellfish. None of these fish or shellfish are important socially, recreationaily, or commercially. The proposed reservoir will have an impermeable liner to prevent downward movement of water and a 90 foot high dam. Given the absence of suitable substrate, low

flows, high temperature, lack of food supply, absence of riparian habitat, absence of spawning and rearing habitat at the site of the constructed cooling water reservoir, and intensive use of the surrounding area for agriculture, the cooling water reservoir area has not supported in the past and does not now support any life stage of the salmonid species listed under the ESA which occur in the Columbia River.

The Cogentrix Facility will use innovative technology and strategies to add an industrial use on top of an irrigation use of water that Mercer Ranch intends to continue using water withdrawn from the Columbia River. The constructed reservoir will be filled with approximately 6700 acre feet of water. Over the life of the project, Cogentrix anticipates that on average up to 3000 acre feet annually of water will evaporate from the reservoir. The once through cooling technology that Cogentrix will use to cool the Facility will result in no evaporative losses, except for de minimis quantities lost to internal uses. Under an agreement between Mercer Ranch and Cogentrix, the initial reservoir fill and annual evaporative losses will be accounted for by reductions in Mercer Ranch water use with no increase in Columbia River diversions. After cooling water circulates through the generating facility and is returned to the reservoir, it will be withdrawn from the reservoir for irrigation use by Mercer Ranch. Mercer Ranch wants the benefit of warmer irrigation water to extend its crop growing season. In short, although the Cogentrix industrial cooling use will be added to Mercer Ranch's existing irrigation use, there will be no increase in the quantity of water withdrawn from the Columbia River as a result of this innovative strategy. Moreover, under an agreement between Mercer Ranch and Cogentrix, Cogentrix will pay the cost of pumping water from the Columbia River to the reservoir. This will save Mercer Ranch and other agricultural entities using water diverted from the Columbia River at the Mercer pump station a significant operating expense.

Absent the Cogentrix facility, all the water withdrawn from the Columbia River at the Mercer pump station will be applied to irrigation. Mercer Ranch's existing pump station is equipped with screens and operates pursuant to flow attraction and volume criteria which prevent listed species from impingement and entrainment in water withdrawals. Mercer Ranch does not propose to install additional screens for its diversions from in the reservoir that serve both Cogentrix and Mercer. Mercer Ranch also does not propose to restrict attraction flows or velocities of its withdrawals from the reservoir shared with Cogentrix. Mercer Ranch also plans to seek authorization to retain the constructed reservoir after the Cogentrix Facility ceases operation to enhance Mercer Ranch water management and use.

EPA Response

The comment describes a proposed facility but does not comment on specific aspects of the proposed rule. EPA notes that the final rule clarifies that the use of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States. Use of cooling water does not include obtaining cooling water from a public water system. This provision is intended to prevent circumvention of these requirements by creating arrangements to receive cooling water from an entity that is not itself a point source.

Comment ID 316bNFR.536.007

Subject Matter Code OPP

General Statement of Opposition

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Authorize EPA And State And NPDES Program Directors To Use Site-Specific Considerations At Least On A Case-By-Case Basis Where National Standards And Locational Attributes Do Not Adequately Account For Physical And Biological Factors And Impacts Which Are Inherently Site Specific And/Or Where The "Best Technology Available" For Minimizing Adverse Impacts Also Is Site-Specific.

The national standards and locational attributes set forth in proposed 40 C.F.R. §125.84 are inappropriate for all circumstances involving a new cooling water intake structure covered by the proposed rule. Where as in the case of the proposed Facility, water placed in the constructed reservoir has already passed through screens and at pump station operating under flow attraction and velocity criteria consistent with NMFS criteria for protection of juvenile salinonid listed under the ESA, requiring installation of similar screens and imposition of flow attraction and velocity restrictions inside the receiving constructed reservoir is redundant, increases the cost of power production, and does not meaningfully protect fish or shellfish resources that are socially, recreationally or commercially important. EPA and state and tribal NPDES program directors should have authority to evaluate on a case-by-case basis the physical and biological factors and impacts of particular cooling water intake structures and the "best technology available" for minimizing adverse impacts on a site-specific basis. Particular facilities may incorporate strategies that minimize adverse impacts on important environmental and natural resources. Inflexible imposition of costly national attributes and locational standards may discourage or make uneconomical use of strategies that are more environmentally beneficial than standardized criteria. Section 125.85(a)(2) would limit use of less stringent criteria to circumstances where the costs of the less stringent criteria are "wholly out of proportion to costs EPA considered in establishing the requirement at issue." That nearly insurmountable standard would precluding balancing of cost and benefits of the less stringent to determine whether the less stringent criteria in site-specific circumstances are adequately protective of environmental and natural 'resources of concern. Administrative convenience should not be preclude consideration of site-specific strategies that serve the statutory goal. Section 125.85(a) should be revised to permit the use of alternative and less restrictive requirements than those set forth in 40 C.F.R. § 125.84 when requirements of that section are disproportionate to the costs and benefits to environmental and natural resources protected by section 316(b), compared to other available strategies.

EPA Response

See response to comment no.316bNFR.069.002 and the preamble to the final rule for the reasons EPA did not adopt the case-by-case approach in this rule..

Comment ID 316bNFR.536.008

Subject Matter Code	10.04
Site-specific Permit Flexibility	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Allow For Variances On A Case-Specific Basis.

The proposed rule should be revised to allow for variances on a case-specific basis. Variances could play an important role in mitigation unnecessary harshness and unintended consequences that may follow from inflexible application of the proposed rule. The unique elements of the cooling water intake structure that Cogentrix proposes to construct (using water that already passes through a pump station facility that complies with NMFS criteria, doubling use of water that currently and in the future will be applied to irrigation) bring into question whether the national standards and locational requirements of the proposed rule warrant the increase costs that would be imposed on the Facility without commensurate benefits to environmental and natural resources. Without predetermining the answer to that question, EPA and state and tribal NPDES program directors at least should be given flexibility to exercise professional judgment whether a variance from national standards and locational requirements is warranted on a case-specific basis, consistent with the goals of section 316(b).

EPA Response

It is not clear, based on the information provided by the commenter that the cooling water intake structure would be in scope of this rule. Cooling water intake structures will be required to meet the requirements of the final new facility rule only if they are a "new facility"; withdraw from "waters of the U.S."; and are required to apply for a NPDES permit.

EPA has maintained the requirements of section 125.85 which allows for alternative requirements if (from Section VII. H. of the Preamble) "... data that could affect the economic practicability of requirements might not have been available to be considered by EPA during the development of today's rule. Therefore, EPA is including section 125.85 to allow for adjustment of the requirements of section 125.84 in certain limited circumstances…. Under this section, any interested person may request that alternative requirements that are less stringent than the requirements of section 125.84 would be approved only if the Administrator determines that compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during development of the requirement at issue, the alternative requirement requested is no less stringent than justified by the wholly out of proportion cost, and the alternative requirements will ensure compliance with other applicable provisions of the Clean Water Act and any applicable requirements of State Law."

EPA has not adopted the type of variance suggested by the commenter because that would in effect change the rule from a technology-based rule to a water-quality based rule. EPA believes that a technology based rule is authorized by 316 and is particularly appropriate for new facilities.

Comment ID 316bNFR.536.009

Subject Matter Code	7.3

Definition: Waters of the US

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Define “Reservoir” To Exclude Constructed Basins Which Have Features And Characteristics (Including Creation In Areas That Have No Historic Fish Or Shellfish Or That Use Water Which Has Already Been Screened To Exclude Significant Fish And Shellfish Resources) That Satisfy Or Overcome The Need For Application Of The Section 316(B)National Standards And Locational Attributes To The Particular Reservoir.

The term “reservoir” as defined in the proposed rule includes all constructed basins. 40 C.F.R. § 125.83. Some constructed basins or reservoirs have features and characteristics that satisfy or overcome the need for application of the national standards and locational attributes of the proposed in section 125.84. One of the principal intended objectives of the national standards and locational attributes is protection of fish and shellfish resources by prevention of impingement and entrainment. Where a particular constructed reservoir’s primary water supply already uses screening and velocity and attraction flow practices that comply with NMFS criteria for protection and exclusion of salmonids, where no socially, recreationally, or commercially important fish or shellfish will be in the constructed reservoir as result of those practices and other unique features of the constructed reservoir, including ancillary uses such as use of water from the reservoir for irrigation such that the reservoir area has limited potential for aquatic life support independent of the cooling water intake facility, and where concerns for “natural thermal stratification” of the water body are inapt because the reservoir serving industrial cooling and agricultural uses does not even exist yet, the final rule should afford NPDES program directors discretion to exclude certain constructed reservoirs from the rule’s national standards and locational attributes on a case-specific basis. NPDES program directors should be authorized to take all relevant factors into account in making decisions whether to exempt certain constructed reservoirs from the rule.

EPA Response

See Response to Comment 316b.NFR.068.151.

The factors mentioned by the commenter may be considered to the extent they are relevant in determining whether the reservoir meets the definition of "waters of the U.S."

Comment ID 316bNFR.536.010

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Define "Adverse Environmental Effects" consistent with the fair notice requirements of the due process clause of the Fifth Amendment. In the absence of a definition adopted through notice and comment rulemaking, the phrase "adverse environmental impact", is standardless and fails to provide meaningful notice to the regulated community or guidance to NPDES program directors as to what triggers the need for action to minimize adverse environmental impact. It is clear from the rulemaking that EPA does not intend a zero impact standard as the trigger for minimization efforts. What is not clear in the proposed rule is what more than zero impact triggers the need for minimization efforts. Under the Fifth Amendment's due process clause, fair notice of what is intended should be provided to the regulated community and NPDES program directors. Fair notice can only be provided through a definition adopted through notice and comment rulemaking.

EPA Response

Although EPA did not place its interpretation of the definition of adverse environmental impact in the regulatory text, since it was not necessary in terms of stating the Track I or Track II performance-based requirements, EPA has, after using notice and comment rulemaking procedures, interpreted the phrase "adverse environmental impact" and has described its interpretation in the preamble to the final rule. As stated in the preamble (see section VI), AEI includes many things, impingement and entrainment among them. AEI also includes reductions of threatened, endangered, or other protected species; damage to critical aquatic organisms, including important elements of the food chain; diminishment of a population's compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function. For purposes of regulating new facilities, where our record shows economic impacts as a percentage of revenue are very low for almost all regulated facilities and we are interested in fast, straight-forward permitting even for Track II facilities, we have chosen to measure minimization of AEI by the (comparatively) easy metric, reduction of impingement and entrainment. See response to comment 316bNFR.068.007.

Comment ID 316bNFR.536.011

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Define "Adverse Environmental Effects" in a manner which avoids constitutional questions whether use of an undefined phrase in this context amounts to an unconstitutional delegation or administratIve usurpation of legislative power. In the absence of a rule defining "adverse environmental effects," administrative implementation of requirements for national standards and locational attributes raises serious questions whether there has been an unlawful delegation or an unlawful administrative usurpation of the Constitution's Article I legislative power. A properly adopted rule properly defining "adverse environmental effects" could resolve this uncertainty.

EPA Response

Under the Supreme Court's recent decision in Whitman v. American Trucking Associations, Inc., 531 U.S. 457, 121 S.Ct. 903 (2001), in order to determine whether there is an unconstitutional delegation of legislative power, the Court looks to the statute, not the regulation. "The idea that an agency can cure an unconstitutionally standardless delegation of power by declining to exercise some of that power seems to us internally contradictory." 121 S.Ct. at 911. In that case, the Supreme Court found that section 109(b)(1) of the CAA, which requires EPA "to set air quality standards at a level that is 'requisite' – that is, not lower or higher than is necessary–to protect the public health with an adequate margin of safety, fits comfortably within the scope of discretion permitted by our precedent." Id. at 193. In so holding, the Court held that it is not conclusive for delegation purposes that ozone or particulate matter were non threshold pollutants and thus inflicted human health at "any concentration greater than zero, and hence require the EPA to make judgments of degree." Similarly, here impingement and entrainment is an adverse effect, and Congress has specified that EPA should determine 'best technology available for minimizing those effects in a manner that it requires EPA to determine best available technology of best available demonstrated control technology for reducing any discharge of pollutants under sections 301, 304, and 306 of the CWA. The Court also stated that we have "'almost never felt qualified to second-guess Congress regarding the permissible degree of policy judgment that can be left to those executing or applying the law.'" Id. at 912, citing Mistretta v. United States, 488 U.S. 361, 373 (1989)(Scalia, J. dissenting). The Court cited a number of examples all of which were found to have an intelligible principle, see, e.g., various statutes authorizing legislation in the "public interest." See., e.g., National Broadcasting Co. v. United States, 319 U.S. 190 (1943); New York Central Securities Corp. v. United States, 287 U.S. 12 (1932). Further, "we have never demanded, as the Court of Appeals did here, that statutes provide a 'determinate criterion' for saying 'how much [of the regulated harm] is too much.'" Id., citing 175 F.3d at 1034. Thus, just as "requisite" constitutes an intelligible principle, EPA believes that Courts will find "best technology available for minimizing adverse environmental impact," along with the factors listed in sections 301, 304 and 306 to constitute an "intelligible principle."

Comment ID 316bNFR.536.012

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Define "Adverse Environmental Effects" in a manner which establishes an administrative standard that courts can defer to under United States vs Mead Corp, and Chevron U.S.A.,Inc. vs Natural Resources Defense Council. The United States Supreme Court's recent decision, United States v. Mead Corp, holds that administrative interpretations of federal legislation adopted without notice and comment rule making pursuant to authority delegated by Congress do not carry the force and effect of law and are not entitled to Chevron deference. The rule proposed by EPA to implement section 316(b) does not define "adverse environmental effects." Absent a rule defining "adverse environmental effects" adopted after notice and comment rulemaking, application of that standard by EPA and state and tribal NPDES program directors will be on an ad hoc basis. In the absence of a national rule defining "adverse environmental effects," different and inconsistent interpretations of that phrase are likely to emerge. None of these interpretations of this critical regulatory phrase will be entitled to any presumption of consistency with the statute or the will of Congress. Neither, the regulated community nor NPDES program directors will benefit from these inconsistencies. EPA should take the time to propose and adopt a rule in accordance with notice and comment rule making a definition of "adverse environmental effects."

EPA Response

Although EPA did not place its interpretation of the definition of adverse environmental impact in the regulatory text, since it was not necessary in terms of stating the Track I or Track II performance-based requirements, EPA has after using notice and comment rulemaking procedures interpreted the phrase "adverse environmental impact" and has described its interpretation in the preamble to the final rule. As such this interpretation should be afforded Chevron deference. See also, Christensen v. Harris County, 529 U.S. 576, 587 (2000), Piney Run v. Commrs of Carroll County, ____ F.3d _____ (4th Cir 2001) 2001 WL 1193211 (applying Chevron deference where the agency's interpretation was issued pursuant to a formal adjudication or notice and comment rulemaking.) Further, by adopting a technology-based approach to this rule, and specifying concrete measures of performance, the rule provides certainty and consistency for new facilities.

Comment ID 316bNFR.536.013

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Define “Adverse Environmental Effects” in a manner which requires that adverse impacts be “significant” rather exceeding the “recurring and nontrivial” threshold described in the August 20, 2000 Federal Register notice. The agency’s August 20, 2000 Federal Register notice suggested that “adverse environmental effects” threshold would be triggered by impacts which are “recurring and nontrivial.” That standard, apart from not being adopted in accordance with notice and comment rulemaking, sets a threshold that will be crossed virtually every time a question of its application arises. The threshold should be raised to a level of significance so that implementation of whatever standards and locational attributes are appropriate for a particular cooling water intake facility will achieve meaningful benefits in relation to costs incurred.

EPA Response

EPA agrees that defining AEI as those impacts that are recurring and nontrivial could result in subjective judgments and rejected this approach for the purposes of today's rule. Under today's rule, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population’s potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a. and responses to comments 316bNFR.501.003 and 316bNFR.068.007).

Comment ID 316bNFR.536.014

Subject Matter Code	19.2
Baseline Biological Characterization Study	

Author Name Michael P. O'Connell

Organization Stoel Rives obo Cogentrix, Inc.

Phase In The "Baseline Biological Characterization" Study Requirement (Which The Proposed Rule Requires Be Submitted One Year In Advance Of NPDES Permit Application) So That It Is Not Applicable To Projects Which Have NPDES Applications Pending At The Time The Rule Becomes Final.

As proposed, "baseline biological characterization" studies must be submitted to the NPDES permitting entity one year before that entity submits its NPDES permit application. In order to meet that schedule, studies or other efforts will have to have been completed even earlier. See 40 C.F.R. § 125.86(a). Some projects will have submitted NPDES applications to NPDES permitting authorities before the proposed rule becomes final. Cogentrix plans to file its application with EFSEC in August 2001. Cogentrix cannot construct the reservoir until it receives authorization in accordance with the process administered by EFSEC. It is impossible for Cogentrix to conduct "baseline biological characterization" studies until after the reservoir and cooling water intake structure are constructed. Other projects will probably file applications with a time after the proposed rule is adopted that would significantly delay construction of projects if the schedule for completion of "baseline biological characterization" studies is not phased in. Cogentrix requests that any requirement for "baseline biological characterization" studies be phased on so that it does not delay construction of energy projects at a time when the Nation critically needs new electricity generation facilities.

EPA Response

EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicants must conduct a considerably more rigorous study if they seek to demonstrate that alternatives to the Track I requirements will equivalently reduce impingement and entrainment at a site.

The NPDES application process under 40 CFR 122.21 requires that facilities submit information and data 180 days prior to the commencement of a discharge. If you are the owner or operator of a facility that meets the new facility definition, you will be required to submit the information that is required under 40 CFR 122.21 and § 125.86 of today's final rule with your initial permit application and with subsequent applications for permit reissuance. The Director will review the information you provide and will confirm whether your facility is a new facility and establish the appropriate requirements to be applied to the cooling water intake structure(s).

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Allen Hubbard

On Behalf Of:

Florida Dept.of Environmental
Protection (FDEP)

Author ID Number:

316bNFR.601

Comment ID 316bNFR.601.001

Author Name	Allen Hubbard
Organization	Florida Dept.of Environmental Protection (FDEP)

Subject Matter Code CP

Comment Period

The NODA summarized a variety of alternative proposals by commenters and EPA. Additionally, it provided numerous references to scientific studies relevant to the proposed rule. Given the number and complexity of the references, not to mention the importance of the issues, we believe that it is reasonable and in the public interest for EPA to extend the comment period for at least an additional thirty days.

EPA Response

EPA agrees that the § 316(b) new facility rule raises a number of complex issues. See response to comment 316bNFR.535.001.

Comment ID 316bNFR.601.002

Subject Matter Code	7.2

Definition: Cooling Water Intake Structure

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

Regulatory Thresholds

It is not evident how the threshold of 25% of the intake being used for cooling provides a good definition of what constitutes a cooling water structure, but neither does it appear unacceptable. However, it is difficult to see how the proportion of facilities with cooling water intakes of various percentages helps to make this decision. The number of facilities affected should not drive the definition, though it might reasonably be a somewhat minor factor.

EPA Response

EPA chose twenty-five (25) percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately sixty-eight (68) percent of manufacturing facilities that meet other thresholds for the rule and ninety-three (93) percent of power-generating facilities that meet other thresholds for the rule use more than twenty-five percent of intake water for cooling. In contrast, approximately forty-nine (49) percent of new manufacturing facilities use more than fifty (50) percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than twenty-five percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgment (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Comment ID 316bNFR.601.003

Subject Matter Code	7.4
Water Withdrawal threshold	

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

Regulating cooling water-using facilities based on their volume but without considering the size of water body from which they draw would seem inappropriate. Some form of the Maryland regulation would be preferable, although a threshold of 20% of the flow past the intake seems very high. A threshold in the 5%-l0% range would seem more reasonable, but the issue of re-entrainment of the water mass should be considered in tidal waters rather than just the flow past the intake.

EPA Response

EPA believes that all cooling water intake flow results in the potential for impingement and entrainment. Therefore, EPA believes that it is appropriate for this new facility rule to address the majority of cooling water intake structure facilities. The 2 MGD threshold was chosen because this threshold addresses 99.7 percent of the total flow and 62 percent of all in-scope facilities. EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the 2 MGD threshold. In addition, EPA believes that the trend in power generation is going toward a general reduction in cooling water intake flow levels over time and there is a trend toward construction of combined-cycle and recirculating technologies which use substantially less cooling water than other technologies.

EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. In addition, EPA has considered the size of the water body in the proportional flow requirements of the rule. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule.

For further discussion of these points, see Section VI, A, 3.

Comment ID 316bNFR.601.004

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

The time limitations of the review period did not allow review of the documents listed. However, it is very difficuIt to understand the assertion by commenters that an estuarine species may actually benefit from reducing larval populations. While it is quite possible that other factors (such as habitat or food) limit population size for a particular species, at the very best reduced larval populations would result in unaltered adult populations. Scenarios where the adult populations would be increased by larval losses are extremely unlikely.

It is possible, however, that the vulnerability of coastal and estuarine populations to cooling-intake losses differs seasonally, such that lesser measures could be warranted during some times of year.

EPA Response

For EPA's position on the issue of compensation see response to comment 316bNFR.039.010.

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. All waterbody types are required to meet the requirements as outlined in Section 125.84. No distinction is made for seasonal differences in aquatic species populations.

Comment ID 316bNFR.601.005

Author Name	Allen Hubbard
Organization	Florida Dept.of Environmental Protection (FDEP)

Subject Matter Code 11.1

EPA Interpretation of Littoral Zone

Abandoning use of “littoral zone” is a good idea. The suggested “Productivity Zone” is probably better than “Area of potential high impact”, but each may end up needing a clear definition. There are benefits to a case-by-case derivation of what constitutes the “productivity zone” (for instance), but the general terminology is still useable. This would, of course, require expertise and data for making that determination.

EPA Response

See response to comment 316bNFR.028.23.

Comment ID 316bNFR.601.006

Subject Matter Code	10.013
Estuary/Tidal River--Proposed Standards	

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

The new definitions are in the right direction, but one comment seems appropriate. This pertains to the statement, “within which the seawater is measurably diluted with fresh water derived from land drainage”. Florida has large areas of reduced-salinity water alongshore that is partly the result of groundwater flow. Depending on what is defined as land drainage, these areas could then be defined as “ocean”. Is this appropriate? Similarly, defining oceans as “marine waters ... seaward of the waters defined as estuary waters” could generate the same problem if the offshore waters are still lower salinity than true oceanic waters, but higher than waters within a riverine estuary. Where does one end and the other begin? Problematic definitions have always existed so wrestling with them must be at least partially a practical decision as well as a science-based one.

EPA Response

In the final rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Therefore, the distinction between waterbody types is of less importance. Facilities must meet the requirements of Section 125.84 regardless of waterbody type.

See response to comment 316bNFR.524.016.

Comment ID 316bNFR.601.007

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

Sufficient data or knowledge does not presently exist to model with reasonable accuracy the effects entrainment on the community of any estuary. Even by limiting the modeling to commercial species (a very poor idea, as the commercial fishery effects outweigh most others), this can't presently be done. Long term, well funded efforts by fishery biologists at the Florida Marine Research Institute (FMRI) to predict adult catches based upon juvenile populations have not been successful. This is also the case in similar efforts of which I'm aware in most other states.

It is, however, an interesting idea to tie entrainment/impingement losses of commercial species to fishery regulation, in effect, making the cooling water intake a fishing competitor. However, as stated above, the ability to link larval and juvenile populations to later adult populations for estuarine/marine species is in most cases not presently achievable.

One of these comments asserts that EPRI and some of the best fishery scientists in the world have never identified a site where definitive or conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures.

Given the near universal existence of uncontrolled confounding factors and high variability, both Type I and Type II error are high for these types of studies and the statistical power is low. This means that being able to make 'definitive' statements about any aspect of population biology is highly unlikely.

EPA Response

Please see response to comment 316bNFR.802.002.

Comment ID 316bNFR.601.008

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

Bioassessment methods do offer the opportunity to determine a stressor. However, as typically used, little or no information about the cause of any observed effects can be determined. Using bioassessment to help determine cause requires a study design with that goal, and, as EPA noted, the presence of confoundingstressors can still prevent this determination. Particularly for estuarine and marine waters, bioassessment methods are not presently sufficiently developed to provide a strong means for determining cause and effect, though efforts are underway to improve this.

It is important to distinguish between biocriteria, which are not useful for this effort, and bioassessment methods, which can be used to determine effect gradients than can identify the cause of stress. However, these gradients cannot be assessed for highly mobile populations such as many fish species and the methods work best for sessile populations. It is reasonable to extrapolate that effects on sessile populations reflect effects on mobile populations, even if those effects cannot be easily measured:

I concur with EPRI that using bioassessment reference sites is not a useful method for estuarine/coastal systems. EPA's guidance document for estuarine/marine biocriteria is also in agreement with this observation.

EPA Response

Please see response to comment 316bNFR.511.005.

Comment ID 316bNFR.601.009

Subject Matter Code	12.11
	5% Mean Annual Flow

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

Perhaps EPA's original rationale (i.e., 5% of flow would equal 5% loss of population) could be amended such that this is the default assumption and regulation proceeds on that assumption, then alterations could made when data shows that conditions or site-specific factors ameliorate that assumption. EPA's thought that changes over time will smooth out population patchiness is reasonable; however, allowance for factors which otherwise reduce a particular population's presence in the intake water might be warranted (e.g., avoidance of shallow water at an intake, normal habitat near shore while an intake is in deep water).

EPA Response

EPA has included the 5% mean annual flow standard for riverine facilities in today's final rule.

EPA has determined that reducing impingement and entrainment on fresh water bodies to the same level as in estuaries and oceans to be technically feasible and economically practicable and believes that this approach affords the same level of protection to all waterbodies.

Instead of varying requirements based on waterbody type EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent performance in reducing impingement and entrainment in a given waterbody by using alternative technologies or approaches.

Comment ID 316bNFR.601.010

Author Name	Allen Hubbard
Organization	Florida Dept.of Environmental Protection (FDEP)

Subject Matter Code 19.2

Baseline Biological Characterization Study

The costs estimated for taxonomy for coastal/estuarine facilities now appear reasonable.

EPA Response

See Response to Comment 316bNFR.501.027.

Comment ID 316bNFR.601.011

Subject Matter Code 10.16

Two Track Process

Author Name Allen Hubbard

Organization Florida Dept.of Environmental Protection (FDEP)

The basic idea seems sound, but would require that the technologies and the types of sites where they are protective can be sufficiently understood and matched so that protection is assured. This does not seem impossible if present data could be assembled to determine the factors controlling the effectiveness of a technology at reducing losses. Certainly some minimum criteria for sites would be necessary.

EPA Response

EPA has chosen Track I type technologies as best technology available for minimizing adverse environmental impacts. Track II provides the opportunity for a site-specific approach and for the collection of the necessary data for making other technologies related decisions than those in Track I. Finally, EPA notes that states may use their own authorities for requiring additional technologies or studies. Today's rule does not interfere with the authorities of states under sections 401 and 510 of the Clean Water Act. See preamble section V.B.1.d for further discussions on this issue.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

B. Randall Melton

On Behalf Of:

Florida Power Corporation (FPC)

Author ID Number:

316bNFR.602

Comment ID 316bNFR.602.001

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name B. Randall Melton

Organization Florida Power Corporation (FPC)

In the Notice, EPA has cited several facilities as specific examples of the occurrence of Adverse Environmental Impact (AEI) in various types of water bodies. In particular, FPC strongly disagrees with the inclusion of its Crystal River Power Plant as an example of AEI, as follows.

The Florida Power Corporation, Crystal River Power Plant, located in Crystal River, Florida, consists of five units. Four of these units (CR-1, 2, 4 and 5) are coal-fired and the fifth (CR-3) is nuclear. Units 1, 2 and 3 are collectively known as CR South and have a separate NPDES Permit. In a 1979 NPDES Permit renewal, the EPA asserted that these three units had caused adverse environmental impacts due to entrainment and impingement. FPC contested this assertion and later conducted impingement and entrainment mortality studies in 1984 which appeared to support a finding of no significant adverse impact. However, EPA interpreted the data differently and, in the 1987 renewal of the permit, reasserted its previous determination (of adverse environmental impact). The Supporting Statement cited an EPA Region IV report which stated that "specific losses" at Crystal River included 23 tons of fish and shellfish annually. However, FPC believed, and continues to believe, that these numbers are inaccurate. The calculations which EPA made to derive the tonnage of losses were based on total entrainment estimates and ignored known survival rate statistics from an entrainment mortality study which had been conducted in 1985. These results actually indicated a high through-condenser survival for certain indicator species. Furthermore, the determination by EPA completely ignored any consideration of the incremental population level impact of entrainment losses on the overall health of regional fisheries. The estimates were never compared with trend data for total commercial take as a basis for determining incremental significance. Finally, there was no consideration of the documented existence of a healthy balanced and indigenous population of commercially important species in the local ecosystem, which provided the most definitive evidence that no significant adverse environmental impact was being caused by operation of the Crystal River cooling system. FPC refuted EPA's findings by citing the above entrainment mortality study results and additional considerations. However, in ensuing negotiations, FPC agreed to a settlement with EPA which required the implementation of an Environmental Enhancement Program (EEP). The EEP included the installation of bar racks and traveling screens, flow minimization practices, salt marsh restoration and the construction of a mariculture center.

In summary the EPA has no supportable basis for citing the Crystal River situation as evidence that AEI has occurred due to entrainment and impingement impacts. The settlement reached between FPC and EPA was simply expedient as a method of resolving permit negotiations and never amounted to a concession by FPC that AEI was, in fact, occurring at Crystal River.

EPA Response

Please see the Response to Comment 316b.NFR.068.410 for response to the issues raised in this comment.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comment 316b.NFR.529.301, 056.005, 068.050, and sections III and VI.B of the Preamble.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

On Behalf Of:

Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

Author ID Number:

316bNFR.603

Note

No comments entered, as these comments duplicated an earlier submission. Comments for this author are coded under 316bNFR.514.

Comment ID 316bNFR.603.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Jonathan F. Lewis & Ann Brewster Weeks, Armond Cohen, Cindy Luppi, Lynn Nadeau, John Thompson, Issac Elnecave, Kurt Waltzer, Jeff Gleason, Karen Hadden & Kevin Williams

Organization Clean Air Task Force also O-B-O HealthLink, IL Environmental Council, MI Env Council, New England Clean Water Action, The Ohio Env Council, Southern Env. Law Center, Sustainable Energy and Econ Dev Coalition & Western Org. of Resource Councils

No comments entered, as these comments duplicated an earlier submission and added signatories. Comments for this author are coded under 316bNFR.514.

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Kerr T. Stevens

On Behalf Of:

N.C. Division of Water Quality

Author ID Number:

316bNFR.604

Comment ID 316bNFR.604.001

Subject Matter Code SUP

General Statement of Support

Author Name Kerr T. Stevens

Organization N.C. Division of Water Quality

The North Carolina Division of Water Quality has no problem with EPA's proposed minimum performance standards per se, provided the state can allow flexibility to industries for selection of appropriate technologies. The state believes that the cooling water intake structures installed at the larger power plants in North Carolina (e.g. at Duke Power, and Caroline Power & Light) were installed after exhaustive biological studies and engineering design work, and provided excellent examples of how to minimize environmental impacts from such structures. Without such flexibility in engineering design, some of these existing structures might not be built today.

EPA Response

EPA believes that the approach it has taken in the final rule affords States flexibility in meeting the performance standard established in the rule. See the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Daniel Orr

On Behalf Of:

Xcel Energy

Author ID Number:

316bNFR.605

Comment ID 316bNFR.605.001

Subject Matter Code CP

Comment Period

Author Name Daniel Orr

Organization Xcel Energy

The Federal Register notice provides only a thirty-day comment period and asks for comment on an array of scientific, biological, engineering, economic, social and environmental concerns. We respectfully request that any additional comments we may choose to file after the June 25, 2001 NODA comment deadline be given due consideration.

EPA Response

Please see response to 316bNFR.505.001.

Comment ID 316bNFR.605.002

Subject Matter Code	10.16
	Two Track Process

Author Name Daniel Orr

Organization Xcel Energy

EPA's proposed rule for new facilities under § 316(b) of the Clean Water Act would require installation of specified technologies deemed performance standards at cooling water intake structures (CWIS) nationwide. The diversity of environmental conditions and aquatic species in the nation's waterways necessitates the ability to develop site specific solutions to entrainment and impingement. The proposal ignores the experience and data collected by utility companies, universities, and regulatory agencies during more than twenty years of § 316(b) permitting. In addition, the prescription of specific performance standards discourages research and development of new and improved technologies to deal with impingement and entrainment issues at CWIS.

The "two-track" approach to CWIS permitting described in the NODA meets EPA's goal of protecting aquatic resources. At the same time it offers new facility developers the option of using the fast track permitting process, that does not require pre-operational biological studies, by installing highly protective CWIS technology. The Track I approach allows a developer to avoid the cost and delays inherent in conducting a baseline biological assessment in return for meeting two criteria. The CWIS must have very low flow consistent with that achieved by a wet recirculating cooling system and it must also have a low intake velocity. Based on data from numerous previous studies meeting these two conditions goes beyond what would be required to minimize AEI in most cases. As an alternative within Track 1 the developer could gather and submit data to demonstrate that an alternative technology would provide the same level of protection as that achieved by the low flow/low velocity method.

Although the option to pursue Track I would lie with the developer of the project, agency personnel would have the authority to require the developer to pursue Track 2. The permit writers would have the option to require use of Track 2 if data exists to indicate that, based on the existence sensitive species or unusual environmental conditions, the project is likely to cause AEI.

Under Track 2 of the approach the developer would follow a course similar to that proposed by EPA. The developer would perform the biological assessment and submit it to the agency to use in determining whether the planned CWIS had the potential to cause AEI. The agency would then determine what CWIS technology or combination of technologies would be required to meet Best Technology Available (BTA) to minimize AEI. The degree of detail required in the studies would be determined by the agency based on the waterbody's designated uses and site-specific conditions rather than the one-size-fits-all approach proposed by EPA. Permit writers could narrow the focus of or eliminate required studies if conditions warranted.

The two-track process provides benefits to both developers and permitting agencies. Developers, by choosing Track 1, are choosing an expedited permitting process in return for agreeing to install highly protective CWIS technologies. The ability to be assured of a permitting timetable and avoid the long delays involved in pre-operational studies would make this approach attractive to many developers. This in turn would reduce the administrative burdens on permit writers for reviewing pro-operational studies for every proposal. The process focuses on protection of aquatic resources rather than

meeting some arbitrary performance standards. The alternative under Track I also encourages the development of new and improved fish protection technologies instead of stifling innovation by prescribing a few technologies.

The two-track approach provides an efficient permitting process that allows for a streamlined permit review where appropriate. The process also affords the agency or the developer the flexibility to choose a more detailed evaluation of the proposed CWIS if either feels that site-specific conditions warrant additional studies.

EPA Response

See response to comment 316bNFR.525.020. For the reasons EPA did not adopt the industry two track approach in full. See the preamble to the final rule.

Comment ID 316bNFR.605.003

Author Name Daniel Orr

Organization Xcel Energy

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

The NODA requested comment on use of dry cooling technology both as BTA and as a requirement for pursuing Track 1 of the two-track approach. Although dry cooling towers may be applicable at CWIS under some exceptional situations, the climate in much of this country is not amenable to the use of dry towers as an efficient means of dissipating the amounts of heat necessary. In addition there are rather severe energy penalties associated with dry cooling requiring additional fuel consumption and associated air emissions to provide the same amount of electricity.

Requiring the installation of dry cooling technologies to pursue the fast track permitting approach is not appropriate. The requirement removes much of the flexibility important to the process and the increased construction and O&M costs and reduced cooling efficiency would make it unattractive to most developers.

EPA Response

EPA agrees with the comment. See section V.C of the preamble to the final rule.

Comment ID 316bNFR.605.004

Subject Matter Code	9.44
Request for Comment: Definition of AEI	

Author Name Daniel Orr

Organization Xcel Energy

EPA requested comment on whether it should define AEI. Xcel Energy supports the definition of AEI in the final §316(b) regulation. In order to be ecologically meaningful, the definition of AEI must be based on a population impact rather than a fixed number or percentage of organisms present. Counting fish or other organisms impinged or entrained does not determine the impact of that loss to the population of those organisms or to the aquatic community as a whole. There are numerous studies and models, used by resource professionals of all types, that have been developed in recent years to assess the effects of human caused impacts to aquatic resources.

EPA Response

See response to comment 316bNFR.507.004 and Section VI.B.2 of the preamble to today's rule.

Comment ID 316bNFR.605.005

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

Author Name Daniel Orr

Organization Xcel Energy

EPA's proposal to define AEI as "recurring and non-trivial" effects of CWIS is ambiguous and confusing. The lack of certainty inherent in the terms will cause problems of interpretation for permit writers. It will also cause further delays in the siting and permitting process because of the confusion of developers in determining what is AEI.

EPA Response

See response to comment 316bNFR.515.004 and 316bNFR.040.003.

Comment ID 316bNFR.605.006

Subject Matter Code 10.16

Two Track Process

Author Name Daniel Orr

Organization Xcel Energy

The development of regulations pertaining to CWIS could have significant impacts to the future siting and development of energy production facilities. The two-track approach proposed by the industry is a reasonable alternative to the one-size-fits-all approach proposed by EPA. The industry proposal allows developers to choose a fast track permitting process by designing the CWIS to avoid AEI thereby facilitating the project planning and scheduling. If the agency or the developer feel there are unusual conditions present that warrant either more or less protective measures a site-specific approach is available that is similar to although more flexible than EPA's original §316(b) proposal.

EPA Response

See response to comment 316bNFR.525.020 and the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Douglas A. Dixon

On Behalf Of:

Electric Power Research Institute (EPRI)

Author ID Number:

316bNFR.701

Comment ID 316bNFR.701.001

Subject Matter Code	10.011
River/Stream--Proposed Standards	

Author Name Douglas A. Dixon

Organization Electric Power Research Institute (EPRI)

Our comments relate to DCN# 2-017A (Memo: Ecological Reasons Why…). Since submitting our comments on June 25, 2001, new information has been brought to our attention that relates to the issues discussed in this document. Specifically, new information that we believe merits consideration by EPA as it works toward developing rules for new and existing cooling water intake structures.

In our comments submitted on June 25, 2001 (minor revisions submitted June 30, 2001), we reported on preliminary data on the relationship between withdrawal flow and the status of fish communities in the source waterbody. One of the analyses for which we provided information relates to studies conducted as part of the National Reservoir Research Program (1963 to ~ 1978)(Jenkins 1977). Our comments are repeated as follows (italicized):

The primary aim of this program was to seek statistically significant relationships between fish standing crop and harvest with such variables as reservoir area, age, mean and maximum depth, water level fluctuation, outlet depth and withdrawal, thermocline depth, growing season length, total dissolved solids, shore development, and storage ratio. 166 reservoirs were included in the study, all but six lying south of the Mason-Dixon Line and east of 100°W longitude (approximately east of the Rocky Mountains).

Preliminary results of this national effort were summarized in our previous comments. We also provided the following information from this program related to fish communities in two reservoirs that support nuclear power plants with once-through cooling water operations:

Jenkins performed a more detailed evaluation of one reservoir, Lake Keowee in South Carolina, which supports both hydropower pump storage and a nuclear power plant. Nuclear plant operations began in 1973 and threadfin shad were stocked in 1974. Total available prey crops varied from 20 to 25 kg/ha in 1974-76, but predator crops declined from 19 kg/ha in 1974 to about 6 kg/ha in 1976. Most importantly, the predicted standing crop of threadfin shad, based on the entire hydropower reservoir storage sample (with limited CWIS withdrawals) was almost exactly the standing crop observed in Lake Keowee. He notes that biologists with Southeast Reservoir Investigations postulate that the apparent decline in predator crop reflected a shift in distribution away from the cove habitats sampled due to increased epilimnial water temperatures. Jenkins and the investigation team concluded, regardless of the cause of the decrease in predator crop, significant decreases in available prey had not occurred.

A similar analysis was performed for Lake Wheeler on which the Browns Ferry Nuclear Plant operates with once-through cooling. The predicted standing crop for Lake Wheeler as derived from 52 hydropower mainstream reservoirs was 275 kg/ha total fish and 130 kg/ha for threadfin shad. Monitoring from 1973 through 1975 found an actual mean total crop of 330 kg/ha and a clupeid crop of 129 kg/ha.

Relative to the latter reservoir, Lake Wheeler, new long-term data has been provided to us by the

Tennessee Valley Authority (TVA 1998) that greatly expands on the relationship between long-term once through cooling operation and the status of the fish community in the lake. Browns Ferry Nuclear (BFN) currently operates two units supported by 6 intake pumps with a rated total capacity of 2,312 MGD. BFN units were placed in operation between 1974 and 1977 (originally, the plant supported three units). The above referenced reservoir-wide monitoring was discontinued in 1980; however, cove rotenone samples were continued to provide a minimum data base on fish community in the vicinity of BFN, particularly in support of BFN's thermal variance monitoring program for the Alabama Department of Environmental Management. Cove rotenone samples have been collected annually during August and September at three sites since 1969. The data base, therefore, includes 5 years (1969-1974) of pre-operational reservoir data against which the long-term operational impacts of the plant can be compared. Details on sampling, species examined (nineteen species were examined and for each species, data were collected for three size classes - young-of-year, intermediate and harvestable or adult), results and analyses performed on the data are provided in TVA (1998). The following key points are summarized:

-Total standing stocks (numbers of fish and biomass) - although standing stock estimates for the reservoir exhibit extreme fluctuations, regression analysis revealed no significant increasing or decreasing trend for either total numbers (fish/hectare) or biomass (kg/ha) during the 30 years of monitoring . The historical mean for the reservoir is 52,514 fish/ha and 762 kg/ha. During the period 1995-97, standing stocks varied from 11,713 fish/ha and 366 kg/ha to 105,655 fish/ha and 683 kg/ha. The 1969 average values for the three coves were approximately 52,000 fish/ha and 1060 kg/ha.

Gamefish:
-Largemouth bass regression analysis identified no significant increasing or decreasing trend.
-Crappie (both black and white) - the only significant trend indicated was a decline in the number of adult white crappie. Crappie are not migratory species and are not concentrated near BFN at any point during their life cycle. The decline is not believed to be associated with BFN operation. White crappie decline may have resulted from occurrence of an extended drought during the mid- to late-1980s. White crappie declined in reservoirs across the Tennessee Valley due to increased water clarity, increased aquatic macrophytes in several reservoirs (including Wheeler), and reduction in nutrient loading. While the drought ended in the 1990's the white crappie have been very slow to return. Black crappie currently dominates most reservoir crappie populations, where prior to the drought, white crappie dominated most mainstem Tennessee River reservoirs and some tributary reservoirs.
-Bluegill - adult bluegill showed a significant increasing trend
-Longear sunfish - the intermediate size-class had a significant decreasing trend; however the adult population has remained stable.
-Redear sunfish - a significant increasing trend was found for young-of year.
-Sauger - no significant increasing or decreasing trend.
-White bass - no significant increasing or decreasing trend.
-Yellow bass - all three size classes have significantly increased.
-Yellow perch - a non-native gamefish to the Tennessee River watershed was first observed in the reservoir in 1977. A significant increasing trend was found for both the intermediate and adult size classes.

Rough Species

-Channel catfish - no trend.
-Common carp - numbers of adult common carp (exotic species) have significantly declined.
-Flathead catfish - no trend.
-Freshwater drum - no trend.
-Golden redhorse - no trend.
-Smallmouth buffalo - a significant decline was found for the intermediate size class; however, no trend was found for adults.
-Spotted sucker - a significant decline was found for the young-of-year and intermediate size classes; however, no trend was found for adults.

Forage Species:
-Gizzard shad - no trend.
-Threadfin shad - no trend

NOTE 1: gizzard and threadfin shad are the dominant species (numbers and biomass) in the reservoir, comprising, on average, 77 percent of the total fish and 55 percent of the biomass. Numbers of both species show wide annual fluctuations in numbers, a typical pattern for these forage fish.

NOTE 2: in addition to the BFN CWIS withdrawal of 2,312 MGD, Wheeler Lake also has an average daily withdrawal of approximately 27 billion gallons per day (BGD) at the downstream Wheeler Dam TVA Hydropower Project. Relative to Lake Wheeler, organisms entrained in this flow are a total loss to the lake; however, there is an approximately equal replacement in hydropower inflow at the upstream Guntersville Dam TVA Hydroelectric Project.

Long-term data sets such as for Lake Wheeler are extremely valuable for examining the relationship between operation of a cooling water intake structure and its impact on the source waterbody fish community, particularly when the data set includes pre-operational fish community data. The above information supplements the data and information EPRI has previously provided, particularly data for cooling lakes/ponds as they have been compared to natural lakes (EPRI 1979, 1980, and 1986). On-going EPRI research is explicitly examining the relationship between water withdrawal and environmental impacts. We anticipate identifying significantly more information such as that provided above. Our research will also be directed at identifying and reporting on data sets that show declines in fish populations as a result of water withdrawal operations, if such data sets exist. The report on this research will be available in fall 2001.

EPA Response

EPA evaluated information previously submitted by the commenter both in their comments and in studies provided to the Agency after the comment period. In summary, these comments and documents asserted that entrainment of very large numbers of eggs, larvae, and early juvenile-stage fish does not necessarily meaningfully affect populations of the entrained species and that substantial percentages of the organisms of many species may survive entrainment. Further, these comments and documents asserted or were intended to support the assertion that impingement survival was high for many species and that impingement often impacts low-value, forage species when they are naturally prone to seasonal die-off regardless of cooling water intake structures. One of these

comments asserted that EPRI and some of the best fishery scientists in the world have never identified a site where definitive or conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures.

In response to comments that entrainment of very large numbers of eggs, larvae, and other life stages of fish do not meaningfully affect populations of entrained species, EPA believes that there is evidence that some fish stocks have been adversely affected by cooling water intakes. In response to assertions that many organisms survive entrainment, EPA maintains that studies show that through-plant mortality rates of young fishes vary depending on numerous factors.(See Section VI.B.2.c of the final rule).

Similar to entrainment survival, EPA notes that studies show impingement survival is dependent on species characterizations such as and life history stage, swimming ability, etc. Impingement survival is also dependent on the type of technology in place and the operational aspects of the intake. EPA is aware that in some cases, with appropriate technologies in place, impingement survival may be substantial for some species. EPA is also aware that impingement survival studies suggest that impingement survival is low for some species such as small bay anchovy and Atlantic menhaden during summers in Atlantic Coast estuaries. EPA does not believe that loss of such forage species should be viewed as having limited importance simply because they have minimal or no commercial or recreational value. From a more holistic, ecological perspective, forage species can have great importance in their role as prey for higher trophic levels, including many commercially and recreationally important fish species. In today's rule, EPA seeks to minimize impingement losses for all affected species.

As of the date of final action on this final rule, November 9, 2001, EPA has not received results of the studies referenced in the comment.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

William Neal

On Behalf Of:

Large Public Power Council (LPPC)

Author ID Number:

316bNFR.702

Comment ID 316bNFR.702.001

Author Name William Neal

Organization Large Public Power Council (LPPC)

Subject Matter Code 21.1

Facility-incurred Costs as a Result of Compliance with Proposed Rule

Energy and Cost Impacts.

LPPC supports the work of the Department of Energy, Electric Power Research Industry, Utility Water Act Group, and others to assess the energy and cost impacts of water-conserving cooling technologies for minimizing aquatic impacts. A careful analysis of this information is important in order to understand fully the costs and benefits of each technology under consideration.

Most importantly, LPPC has concerns with EPA adopting a regulatory framework that would have the effect of requiring the use of closed-cycle wet or dry cooling systems. As a general matter, the costs for closed loop cooling systems, wet or dry, will be substantially higher than for once-through systems. The reason for the higher cost is due largely to the cost of the towers (or air-cooled exchangers) themselves, as well as to the requirements for larger circulating pumps, more extensive chemical feed systems and systems to treat or dispose of blowdown. Other factors that could influence initial capital costs include the price of land, the need for low noise fans and the selection of design point. Closed cycle systems also require significantly more operating energy to power the fans and circulating pumps.

EPA Response

EPA has accounted for each of the costs components of cooling towers addressed by the commenter. For those nine facilities projected to install closed-cycle wet cooling systems as a result of this rule, EPA has accounted for the cost of the cooling towers themselves, the recirculating pumps, the chemical feed systems, and treatment and disposal of blowdown (note, however, that the costs of chemical feed and treatment and disposal of blowdown are extremely small in comparison to other cost components for cooling towers). The cost of acquiring additional land for cooling towers is not a significant issue, as researched by EPA. Also, low noise fans are not a representative design feature appropriate for the average installation of a cooling tower on a national basis. EPA has also addressed the power necessary to operate the pumps and fans of the towers. Each of these issues is addressed in Chapter 2 of the Technical Development Document.

Comment ID 316bNFR.702.002

Subject Matter Code	10.11
Request for Comment: Dry Cooling--Proposed Option	

Author Name William Neal

Organization Large Public Power Council (LPPC)

Wet Closed-Cycle Systems.

A benefit of a closed-cycle wet systems is that they can reduce the water withdrawal rates to approximately 2 to 3 percent of those facilities with once-through cooling. However, such water withdrawal is "consumptive use" as compared with "non-consumptive use" for once-through systems. Conservative estimates indicate that the cost of retrofitting a wet cooling system to a plant designed and built with once-through cooling ranges (at a minimum) from $5 to $25 million in capital costs (for a 250 MW plant) with substantial additional annual costs. The increased annual costs would result from increased in-service energy requirements, reduced efficiency, higher O&M costs, and potential replacement capacity purchases. The reason for the higher annual costs is that closed loop cooling systems will generally incur higher operating and maintenance costs as compared to once-through systems. Closed systems have additional equipment that consumes power for parasitic loads, which cannot be sold to the grid and represents lost revenue. <fn2> In addition, closed-loop systems tend to cause turbine back pressure that lower the thermal efficiency (i.e., heat rate) of the generating facility. These reductions in net generation efficiency result in increased emissions of regulated air pollutants (e.g., NOx, SO2, and mercury) as well as greenhouse gases such as CO2 due to higher fuel consumption per megawatt hour output of electricity.

Footnotes

2 For wet cooling systems, for example, there will be an increase in the size of the circulating water pumps, fans to draw air through the tower, additional treatment chemical storage and feed systems and systems to treat or discharge cooling tower blowdown.

EPA Response

EPA notes that it received this comment on August 6, 2001, far after the close of the notice of data availability, which closed on June 25, 2001.

EPA disagrees that consideration of retrofit costs is appropriate for a new facility rule.

EPA adopted closed cycle wet cooling as the technology-basis for the requirements of the rule for the reasons discussed in Section V of the preamble to the final rule.

Comment ID 316bNFR.702.003

Author Name William Neal

Organization Large Public Power Council (LPPC)

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Dry Closed-Cycle Systems.

If retrofit to dry cooling becomes necessary, the incremental environmental benefits (from reduction in withdrawal rates) would be quite small. A 95 percent reduction in water use resulting from a dry closed-cycle cooling system, for example, would be only an additional 1.9 to 2.9 percent reduction over wet closed-cycle systems. This small incremental reduction would unfortunately come at a very high cost. Conservative estimates indicate that the capital costs for a 250 MW plant would range (at a minimum) from $25 to $55 million with substantial additional annual costs from increased in-service energy requirements, reduced efficiency, higher O&M costs, and potential replacement capacity purchases. Dry towers (direct ACC systems) will not require circulating water pumps, but will have a much higher power requirement for the fans given the amount of air required to cool the unit in a dry system vs. that required in a wet system. Conservative estimates indicate a significant energy penalty resulting from the parasitic load and reduced thermal efficiencies due to turbine back pressure. A five percent reduction of the plant's gross output is a realistic projection of the combined energy penalty resulting from dry closed-cycle systems. This reduction in net generation output would result in substantial increases in NOx, SO2, mercury and CO2 emissions due to higher fuel consumption per megawatt output of electricity.

EPA Response

EPA notes that it received this comment on August 6, 2001, far after the close of the notice of data availability, which closed on June 25, 2001.

EPA disagrees that consideration of retrofit costs is appropriate for a new facility rule.

EPA adopted closed cycle wet cooling as the technology-basis for the requirements of the rule for the reasons discussed in Section V of the preamble to the final rule.

Comment ID 316bNFR.702.004

Subject Matter Code 21.4

Cost Impacts

Author Name William Neal

Organization Large Public Power Council (LPPC)

Cumulative Costs of Water and Air Regulations.

LPPC strongly urges EPA to examine carefully and assess the combined costs of future water and air regulatory programs on both new and existing electric generating units. In addition to this section 316(b) rulemaking, EPA has underway numerous regulatory initiatives to require additional controls for NOx, SO2, and mercury under the Clean Air Act. The costs of adding closed loop cooling to existing power generating units in combination with adding controls for SOx, NOx, and mercury will likely cause some plants to become uneconomic, resulting in premature retirement, and necessitate the construction of costly new generating capacity. In addition to adverse energy impacts of early plant retirement, the outages necessary for retrofitting such control technologies or cooling systems could cause regional power shortages. At a minimum, the net effect will be increased costs of electricity, most likely at substantial levels. EPA is required by the President Bush's recent executive order to address these considerations as it moves forward with the rulemaking. (See Executive Order 13211—Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use, issued May 18, 2001.)

EPA Response

EPA would like to point out that the concerns raised by the commenter ("costs of adding closed loop cooling to existing power generating units," "early plant retirement," and "outages necessary for retrofitting") are not relevant to the section 316(b) New Facility Rule as they do not apply to new facilities.

In compliance with E.O. 13211, EPA conducted an analysis of the potential energy effects of the final section 316(b) New Facility Rule and found them to be insignificant (see also Chapter 9: Other Economic Analyses of the Economic Analysis document).

While EPA acknowledges that other federal regulations, such as the example provided by the commenter, may impact the entities subject to this rule, EPA notes that the cost to revenue impacts due to this rule are very small, even for the extremely small number of new facilities (nine) that will incur the majority of the costs of this rule. The limited economic impact of this rule is, in EPA's view, sufficiently small such that cumulative impacts with other federal regulations are not an issue. In addition, the Agency intends to consider this topic in the development of the existing facility regulation, for which the cost to revenue impacts and the number of facilities impacted may differ from this new facility rule.

EPA also notes that for the case presented by the commenter no specific economic impact or revenue test information is provided with which EPA can analyze cumulative impacts.

Comment ID 316bNFR.702.005

Subject Matter Code 10.16

Two Track Process

Author Name William Neal

Organization Large Public Power Council (LPPC)

Two-Track Alternative.

LPPC supports the Two-Track alternative presented in the NODA. It provides a useful framework that provides flexibility and other advantages by allowing utilities to pursue one of two tracks for meeting their section 316(b) obligations. Under the "fast track," the utilities could choose to commit to meeting highly protective flow and velocity standards, or to using one or more highly protective technologies that it would show provide a level of aquatic resource protection within the same general range. Such would satisfy section 316(b) by avoiding adverse environmental impact. Alternatively, utilities could choose to conduct a site-specific study to determine the best technology available (BTA) for minimizing adverse environmental impact for the site.

LPPC believes that this approach seems to meld together the desirable elements of current practice while acknowledging the convenience and ease of administration of a technology approach. We believe that many companies will choose the fast track option, where meeting those standards is technically and economically feasible. But for some facilities such technology may not be technically or economically feasible or environmentally warranted, and the site-specific approach would need to come into play. We believe that the two-track approach is an appropriate means of preserving this needed flexibility.

EPA Response

See preamble section V for further discussions of the basis of today's requirements and section VII for discussions on their implementation and for an explanation as to why EPA did not in full, adopt the industry approach.

Comment ID 316bNFR.702.006

Subject Matter Code 10.16

Two Track Process

Author Name William Neal

Organization Large Public Power Council (LPPC)

We are particularly pleased to see that the site-specific track 2 approach described in the NODA would not anticipate that every site or every proposed plant design would require the same type of study or the same level of effort. In fact, track 2 provides some objective criteria by which a state permit writer can reasonably assess whether a site-specific study demonstrates the facility will minimize AEI. For example, the alternative outlines using biological, locational, design, and operational data from the site in a manner consistent with EPA's Risk Assessment Guidelines.

EPA Response

See preamble section VII for discussions on implementation issues of today's two-track, technology based approach.

Comment ID 316bNFR.702.007

Subject Matter Code 10.16

Two Track Process

Author Name William Neal

Organization Large Public Power Council (LPPC)

LPPC believes that the two-track approach is environmentally protective, efficient, and provides appropriate flexibility, and we support its use for new facilities. Among other things, the proposed two-track approach makes sense because it:

-is environmentally protective;
-preserves site-specific decision making, allowing more tailored and cost-effective solutions;
-establishes a more consistent process for site-specific decision making, so that similar cases will be treated similarly;
-allows new facilities the option of using highly protective technologies in order to speed the decision making process, but allows permit writers to make final decisions about whether those protective measures are appropriate and sufficient;
-uses incentives rather than “command and control” requirements to achieve the objectives of the statute; and
-avoids delaying the new facility permitting process (and the concomitant impacts on energy supply) except where justified by important site-specific circumstances.

EPA Response

See response to comment 316bNFR.526.002 and the preamble to the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Joseph O'Hagan

On Behalf Of:

State of CA - The Resources Agency

Author ID Number:

316bNFR.703

Comment ID 316bNFR.703.001

Subject Matter Code 21.4

Cost Impacts

Author Name Joseph O'Hagan

Organization State of CA - The Resources Agency

The attached report is a draft of a chapter (chapter 5) from a document that address the economic, performance and environmental aspects of the use of wet, dry and wet/dry cooling for power plants in California. John Maulbetsch has prepared this report from which the chapter is taken under contract with the Electric Power Research Institute (EPRI) for the California Energy Commission. This draft chapter of the report addresses cost comparisons between these cooling technologies and is provided in regard to the cooling technology discussion in the proposed rule and in the Notice of Data Availability. I must stress that this chapter, as with the entire report, is not complete nor has it been subject to peer review. It is anticipated that peer review comments will be submitted by August 20 and shortly thereafter, a final copy will be submitted to the Environmental Protection Agency.

[report not coded--see original document for the attachment]

EPA Response

EPA notes that the comment submission was received at an extremely late stage of the rulemaking process, well after the close of all comment periods. EPA has no legal obligation to respond to such late comments. See e.g., Personal Watercraft v. Dept. of Commerce, 48 F.3d 540 (D.C. Cir. 1995). Nevertheless, EPA has attempted to respond to these comments to the extent possible.

EPA was only able to review the referenced material on a surface level due to the extremely delayed submission. As such, EPA was not able to analyze the material with the depth required for inclusion in its final analyses. However, based on the cursory review, EPA can state that it is not aware of any material submitted in the comment that persuades any changes to the analyses supporting the final rule.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

David E. Bailey

On Behalf Of:

Utility Water Act Group (UWAG) c/o
Hunton & Williams

Author ID Number:

316bNFR.704

Comment ID 316bNFR.704.001

Subject Matter Code	OPP
	General Statement of Opposition

Author Name David E. Bailey

Organization Utility Water Act Group (UWAG) c/o Hunton & Williams

The Incremental Benefit to the Environment of a New §316(b) Rule May Well Be Close to Zero

Two of the documents listed in the reopening of the NODA, DCN #2-018B-R2 and DCN # 2-019A (see 66 Fed. Reg. 35,573 col. 1), address biological statistics and population modeling. Here is what needs to be said about biology, based on the § 316(b) rulemaking record. The many documents now in the record lead to a striking conclusion: Under the present, case-by-case application of § 316(b), cooling water intake structures are, generally speaking, not causing adverse environmental impact.

For this reason, there is likely to be little or no benefit to the environment of making a new § 316(b) rule. To show that this is so, EPA need only look at the studies of actual impacts of cooling water intake structures in the record. UWAG therefore asks that EPA consider those studies as a group. The paper entitled "Ecological Reasons Why Freshwater River and Reservoir Ecosystems Do Not Normally Experience Measurable Environmental Impact as a Result of Impingement and Entrainment" (DCN #2-017A in the July 6 Federal Register notice), for example, contains many useful references. Consider also TVA's long-term monitoring of Wheeler Lake (associated with the operation of the Browns Ferry nuclear plant), where 30 years of field monitoring reportedly shows no significant trend (either increasing or decreasing) in biomass or total fish.

Likewise, a 1980 report summarizes over 10 years of biological and hydrological studies on the Cape Fear River Estuary and near-shore ocean, where the Brunswick Steam Electric Plant is located. Based on studies from 1968 through 1979, the principal investigators concluded that the operation of the plant resulted in no adverse environmental impact due to entrainment and impingement. There was no evidence of abnormal trends in the relative abundances of larvae, juveniles, or adults of the representative important species or of changes in the structure of the nekton community in the Cape Fear River Estuary (CP&L. 1980. Brunswick Steam Electric Plant, Cape Fear Studies Interpretive Report. Carolina Power & Light Co. New Hill, NC).

There are also two useful reports on the impact of once-through cooling intakes on Lake Michigan. One, a 1977 study by CDM/Limnetics, collated 1970's entrainment and impingement data for every power plant on the Lake and contrasted the loss of fish from entrainment and impingement with the commercial and recreational harvests. Another assessment was conducted by Argonne National Laboratory and published as an EPA report (EPA-905/3-81-001) in l98l. Both reports examine the cumulative impact of all power plant cooling water intake structures on the three most-impinged and -entrained species, alewife, smelt, and yellow perch. Both estimated that the cumulative impacts represented only a few percent, at most, of the standing stock levels then present in the Lake. Today the standing stocks for all three species are lower, due to inter-specific competition, because hundreds of millions of nonnative and native trout and salmon have been stocked in the Lake in order to provide a high-quality sport fishery. With respect to the commercially valuable species in the lake (whitefish and yellow perch), some of the cooling water intake structures that historically affected the species either no longer exist or have taken measures to protect fish, so the existing cooling water intake

structures are likely to affect these species substantially less today than when they were assessed in the 1977 and 1981 studies. Although assessment of the fisheries in the Great Lakes is made more complicated, with respect to the impact on the "native" fishery, because of state and provincial management actions and both the deliberate and accidental introduction of exotic organisms, including fish, mussels, algae, and zooplankton, the direct impacts of entrainment and impingement on most species has, and continues to be, low if not unmeasurable.

Other studies also support the conclusion that cooling water intake structures are not doing serious harm, such as T. Lohner, Modeling Possible Cooling Water Intake System Impacts on Ohio River Fish Populations. This study used electrofishing data collected from 1991 to 1998 to demonstrate that in 16 out of 22 fish species-river pool scenarios, the projected fish population changes due to entrainment and impingement were less than the normal variation of the existing fish populations.

Finally, examples of successful fisheries in cooling ponds show that cooling water intake structures do not necessarily create adverse impact. Cooling ponds are constructed solely for the purpose of providing condenser cooling water, and although a very high percentage of cooling pond water normally passes through the cooling water intake structure, many of these ponds support naturally reproducing fisheries. See L.L. Olmsted and J.P Clugston. 1986. Fishery management in cooling impoundments, in G.E. Hall and M.J. Van Den Avyle, eds., Reservoir Fisheries Management: Strategies for the 80's: 227-37; American Fisheries Society. Bethesda, MD; Rodriguez M.S. and L.L. Olmsted. 1993. Variation in fish community composition, biomass, and harvest relative to environmental SEAFWA: 553-570; Barwick, D.H., L.E. Miller, W.R: Geddings, and D.M. Rankin. 1995. Fish biomass and angler harvest from a South Carolina cooling reservoir. 1995 Proc. Annu. Conf SEAFWA: 129-139. See also EPRI, Evaluation of a Cooling-Lake Fishery (EPRI EA-1 148), Vol. 1 (July 1980) (comparing a. cooling lake (Lake Sangchris) and a nearby unheated lake (Lake Shelbyville)); UWAG's comments of November 9, 2000, sections VlI.A, VII.E. 3-4, VII.F, VII.G. I & 4, VIII.C; UWAG's comments on the NODA, June 25, 2001, at page 36.

Based on the rulemaking record, then, EPA could well conclude, and possibly should, that no § 316(b) rule is needed. Alternatively, EPA could use the "two track" approach described in the NODA.

EPA Response

EPA disagrees that there are no environmental impacts associated with cooling water intake structures. Section III of the final preamble provides several examples of the environmental impacts associated with existing cooling water intake structures that are illustrative of the substantial numbers of aquatic organisms that can be impinged or entrained by cooling water withdrawals.

Further, EPA disagrees with the conclusions drawn by CP&L in their 1980 interpretive report of the Brunswick facility. Specifically, the commenter states that the study's principal investigators determined that operation of the plant resulted in no adverse environmental impact due to impingement and entrainment. As discussed in section III of today's preamble, cooling water intake from the Brunswick Nuclear Steam Electric Generating Plant impinges or entrains 3 to 4 billion organisms annually from the Cape Fear estuarine system, equivalent to the loss of approximately 23 million fish and shrimp available to the mid-Atlantic sport and commercial fisheries per year. In contrast to the

commenter, EPA believes these are appreciable losses. Section III of the preamble further notes that entrainment mortality of a representative fish species (spot) within the Cape Fear estuarine system was predicted to result in a 15 to 35 percent reduction in the species population. Again, EPA believes this level of impact is substantial. Finally, EPA does not have confidence in the CP&L modeling results cited by the commenter. In a review of these results, expert witnesses stated for the record that the models used were of "doubtful value" because of numerous biological uncertainties.

With respect to cumulative impacts, EPA agrees with the commenter that multiple stressors on fish populations, including the example of introductions of non-native species as provided by the commenter, can confound assessments of cumulative impact and make it difficult to determine causality for population declines. Therefore, EPA maintains that the potential cumulative impacts of multiple intakes and multiple stressors on fish and shellfish are largely unknown and require additional study (see preamble section III and VI.B.2.c and VI.B.3).

As discussed in preamble section VI.B.2.c, extensive data sets (20 or more years of monitoring data) are often required to adequately assess whether or not cooling water intakes are affecting a fish population. These long-term data sets are not currently available for many species, making it difficult to ascertain the relationship between the sustainability of these populations and cooling water intake operations. In addition, EPA, NMFS, and other fishery resource managers acknowledge that there is a high degree of uncertainty related to managing fishery stocks, regardless of the amount of scientific effort invested and the use of the best modeling techniques currently available. NMFS in particular recommends that this uncertainty be acknowledged and accounted for by developing risk-averse fishery management strategies that diverge from the traditional mode of restricting fishing activities once unacceptable impacts occur, to a future mode that only allows fishing activities that can reasonably be expected to operate without unacceptable impacts. EPA also concurs with fisheries scientists that the reliability of model predictions is limited by our overall narrow scientific understanding of the complexity of aquatic ecosystems and the long-term effects of historical anthropogenic activities. Because scientists are only recently beginning to examine the long-term historical record of overfishing and its effect on ecological systems, EPA is concerned about the sensitivity of aquatic ecosystems, particularly coastal ecosystems to additional forms of disturbance such as entrainment and impingement that have not been adequately evaluated (see preamble section VI.B.2.c).

Contrary to the commenter, EPA believes that the record for today's rulemaking shows quite strongly the need for regulation of cooling water intakes. Perhaps the commenter will need to carefully consider the two-track framework described in today's rule.

Comment ID 316bNFR.704.002

Subject Matter Code	21.4
	Cost Impacts

Author Name David E. Bailey

Organization Utility Water Act Group (UWAG) c/o Hunton & Williams

The § 316(b) Rule May Have Economic Impacts that EPA Has Not Considered

UWAG has been made aware recently of certain economic impacts that may result from the § 316(b) rule but that do not appear to have been considered. These impacts arise because of utility companies' need, especially in the water-short West, to make long-term commitments to acquire water for cooling.

Some utilities, especially in the West, acquire water rights or long-term water supply contracts or both for the water they use for cooling. TXU, for example, is one of the largest holders of water rights in the State of Texas. TXU pays approximately $11 million per year for water contracts needed to operate existing generating facilities or to reserve water for future generating facilities. TXU enters into long-term (generally 30-50 year) contracts in order to secure its water.

If the cooling water covered by these water rights and contracts could no longer be used for cooling because of EPA's new § 316(b) regulations, then two kinds of economic impact would result. The first consists of transition costs resulting from a shift in regulatory requirements and the "stranded costs" that are created by the change in water use. For example, a utility may have been ordered by its public utilities commission to construct a generating plant and cooling water reservoir at a certain location. Having acquired the land for the reservoir and having contracted for water to fill it, the utility might then find that it could not use the water for cooling because EPA had required wet cooling towers in its new § 316(b) rule. The cost of the reservoir would not yield the benefits intended and, indeed, there might be no other use for the reservoir to the utility. The transition losses could extend beyond the utility (or its ratepayers). The utility would probably have planned to develop the reservoir for fishing and boating as well as for cooling water, and so EPA's (in effect) cancellation of the reservoir project would deprive the public of a recreational opportunity. Transition costs will result from the need to change commitments already made, some of which could not be undone without sustaining the cost.

There also may be a substantial economic impact on the utility itself. If the utility cannot recover the cost of the reservoir in rates, it will have to absorb the cost. Moreover, the utility will now have to attempt to sell the water, with resulting effects on the market for water. If the company cannot sell the water contracts or water rights to someone else, then it will have spent millions of dollars for water it can no longer use. Even if it can find a buyer, it may not be able to recover its full costs. It is even possible that EPA's action would be a "taking" for which the government would have to compensate the owner of the water rights or water contracts. See Tulare Lake Basin Water Storage District v. United States, 49 Fed. Cl. 313 (2001); Palazzolo v. Rhode Island, 121 S. Ct. 2448 (2001). Finally, the § 316(b) rule could have a negative impact on the country's energy supply by leading to the cancellation of generating facilities that would otherwise be constructed.

The economic impact on utilities that have acquired water rights or water contracts and the transitional costs resulting from disrupting the water use regime should be addressed by EPA before it

promulgates a § 316(b) rule that would have such effects.

EPA Response

EPA notes that the Utility Water Act Group did not bring this subject to the attention of the Agency until the eleventh hour of the rule making process for the new facility rule despite numerous comment periods, a comment period extension, and numerous meetings between the parties.

Therefore, the Agency considered the subjects raised by the comment to the best of its ability within the limited time available. EPA has no legal obligation to respond to such late comments. See e.g., Personal Watercraft v. Dept. of Commerce, 48 F.3d 540 (D.C. Cir. 1995). Nevertheless, EPA has attempted to respond to these comments to the extent possible.

The example presented by the commenter is neither documented by supporting evidence nor fully explained. Specifically, the commenter states that "TXU pay approximately $11 million per year for water contracts needed to operate existing generating facilities or to reserve water for future generating facilities." However, the commenter does not provide any further information to distinguish the portions of the water rights that are reserved for future generating facilities deemed new facilities in this rule. Because this is a new facility rule, the portion of the annual costs for planned new facilities is the only topic pertinent to the discussion.

Because the commenter failed to provide any information about TXU or the breakdown of the $11 million per year water rights fees, the Agency conducted research into TXU Electric & Gas using the E-GRID 2000 database and the Agency's detailed estimates of future generating capacity. As of the beginning of 1999, TXU owned or operated 22.3 gigawatts of generation in the State of Texas. Therefore, according to the commenter's data, TXU is committed to annual fees of $11 million for 22.3 gigawatts of current generation and unknown amount of planned future generation. The Agency conservatively estimates that approximately 8 gigawatts of new combined-cycle capacity will come on-line in Texas over the next twenty years and fall within scope of this rule (from NewGEN). There are approximately 4 gigawatts of shelved plans (according to the Department of Energy) for coal facilities over the next ten years in Texas that will likely be abandoned. Even in the highly unlikely case where all of this capacity is built, the upper bound for new capacity over the next twenty years in the State of Texas is less than 12 gigawatts for coal and combined-cycle facilities. Clearly, the prospects of one utility controlling all future combined-cycle and coal capacity in Texas is highly improbable. As of the end of 1998, TXU controlled approximately one-quarter of the total capacity in the State of Texas. Therefore, the Agency will, for the sake of argument, estimate that TXU might control one-quarter (3 gigawatts) of the hypothetical 12 gigawatts of new capacity of the next twenty years that possibly could come on-line in Texas. Hence, of the $11 million in annual water rights fees for existing and planned capacity that TXU pays, approximately $1.3 million per year might be appropriated for water rights for possible future TXU generation capacity of less than 3 gigawatts.

Conservatively, three gigawatts of future generation capacity within the scope of this rule would represent approximately 4 average sized coal or combined-cycle power plants. Therefore, the maximum possible water rights fees that TXU may have allocated for future capacity could represent, at a maximum, an annual fee of $325,000 per new facility. Because the commenter did not present

this information in their late comment submission, the Agency uses this value as the best estimate that it could find at this late juncture.

If TXU in fact builds approximately four new power plants that fall within the scope of this rule, it is highly probable that the majority of these plants are currently planned with recirculating wet cooling towers or similar technologies (such as a recirculating cooling pond, that meets the requirements of the Track I flow reduction requirements, provided that it is not considered a water of the US). However, as is the case for a small minority of projected new facilities, for the purposes of responding to this late comment, EPA considers what would happen if one of these new facilities may be planned to utilize a once-through system on a water of the US. When that is the case, the Agency estimates, despite the flexibility of the Track II pathway, that the plant will reduce their intake flow by greater than 90 percent by adopting recirculating wet cooling. If that were the case, TXU would need to find a purchaser for approximately $300,000 per year of water rights that they might already control. In EPA's view TXU would have little or no difficulty in finding a purchaser of these water rights, but in the extremely unlikely scenario where the utility would be unable to sell highly sought after water rights, the company may be forced to absorb costs of $300,000 for several years before finding a water rights purchaser. This cost is insignificant compared to the cost of installing, operating, and maintaining a wet cooling tower over the life of the equipment. For these reasons, the Agency disagrees with the commenter's assertion that the Agency is overlooking significant costs of the new facility rule associated with water rights fees.

Regarding the topic of cooling ponds and reservoirs, the Agency notes that if the facility intends to use a recirculating cooling pond or reservoir and this water body is not considered a water of the US, then the issue of flow reduction is moot. The requirements of the final rule clearly state that for the purposes of flow reduction, recirculating cooling ponds and reservoirs achieve flow reductions that are commensurate with that of closed-cycle recirculating wet cooling systems. Therefore, the entire discussion of lost revenue from a cooling pond is irrelevant.

In the case where a recirculating cooling reservoir is deemed a water of the US by the State or EPA Region, then EPA estimates that facilities planning to use once-through cooling from these waters would need to upgrade to recirculating wet cooling towers to meet the Track I requirements of the final rule. There is still the possibility for the facility to demonstrate that it meets the Track II requirements while utilizing a once-through system. However, the Agency conservatively estimates that the incremental costs of the wet cooling tower system upgrade are appropriate for these types of facilities. This only means that the Agency anticipates that the facility will incur the costs of the cooling tower system, but it does not mean that the Agency dictates that towers must be installed. If the facility has planned to construct a recirculating cooling reservoir and the incidental uses of this reservoir (such as fishing and recreational boating) are crucial to the economic purpose of the project, then the utility should, by all means continue with the reservoir's construction. There is no reason given by the commenter nor known to the Agency why installation of a cooling tower would impede these recreational uses. Even in the case that this reservoir might be deemed a water of the US by the facility's local authority, the new facility rule in no way requires the facility to abandon construction of the reservoir because additional, economically practicable costs related to this rule are incurred.

Comment ID 316bNFR.704.003

Subject Matter Code	9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria	

Author Name David E. Bailey

Organization Utility Water Act Group (UWAG) c/o Hunton & Williams

EPA Should Encourage the Use and Further Development of EPA's Ecological Risk Assessment Guidelines

Several references included in the reopening of the record relate to risk assessment (2-019A-R4, Risk Assessment in Conservation Biology; 2-019A-R9, Confronting Uncertainty in Risk Management; 2-019A-R11, Quantitative Fisheries Stock Assessment: Choice, Dynamics and Uncertainty; 2-019A-Rl8, Science and Judgment in Risk Assessment; 2-019A-R22, Ecological Risk Assessment). UWAG supports the use of ecological risk assessment and believes it has an important place in making § 316(b) decisions.

In 1998, EPA published Guidelines for Ecological Risk Assessment. 63 Fed. Reg. 26,845 (May 14, 1998). Other studies and guidance on ecological risk assessment have followed, such as the Workshop Report on Characterizing Ecological Risk at the Watershed Scale (EPA/600/R-99/111 February 2000) and, most recently, the draft Planning For Ecological Risk Assessment: Developing Management Objectives (EPA/360/R-01/001A June 2001) (External Review Draft).

UWAG does not necessarily endorse every word of these documents, but it is not necessary to catalogue our agreements or disagreements here, in the § 316(b) rulemaking. What is important is to recognize that ecological risk assessment should play a role in § 316(b) decisions. Accordingly, UWAG has recommended that, when a close look at a site of a cooling water intake structure is necessary either to determine whether the intake structure presents a risk of "adverse environmental impact" or to determine what is "best technology available" for minimizing it, EPA's Guidelines for Ecological Risk Assessment offer a promising, systematic approach. EPA should continue to refine the guidelines as experience with ecological risk assessments is gained in § 316(b) decisionmaking.

One caution UWAG would offer is that using "ecological risk assessment" does not mean merely piling on one conservative assumption after another in the interest of avoiding all risk. Ecological risk assessment is supposed to offer the decisionmaker the information he needs to make appropriate risk decisions. That does not mean eliminating all risks but rather making an informed decision of what level of risk is appropriate, given the conditions of a proposed site, the need for the proposed electric generating facility, and other relevant facts and circumstances.

EPA Response

EPA agrees that risk assessment concepts are important in terms of evaluating adverse environmental impacts. EPA considered and applied ecological risk assessment concepts when developing today's interpretation of AEI. Specific ecological endpoints that were considered included individuals, populations, and communities.

Comment ID 316bNFR.704.004

Subject Matter Code	21.0
	Cost/Benefit Analysis

Author Name David E. Bailey

Organization Utility Water Act Group (UWAG) c/o Hunton & Williams

Existing Methods of Benefit-Cost Analysis Can Be Adapted for § 316(b) Decisions so that the Level of Effort Is Tailored to the Needs of the Site

In its past comments, UWAG has urged that, when there is an appreciable risk of "adverse environmental impact" from a proposed cooling water intake structure, and it therefore is necessary to determine what is "best technology available" for the site and facility in question, the technology chosen should be that which maximizes net social benefits.

UWAG's consultant NERA has examined some of the other environmental programs that make case-specific determinations with an eye toward examining their relevance for 316(b) determinations. NERA's analysis and conclusions are contained in the attached report/presentation, which UWAG offers as a comment on the § 316(b) rule for new facilities. Entitled "Site-Specific Benefit-Cost Analysis for Section 316(b) Permits: A Tiered Approach," the NERA report/presentation considers two other environmental programs, determining the value of violating environmental requirements (using EPA's BEN model) and assessing natural resource damages under Superfund. The NERA report/presentation is selective rather than comprehensive, since there are other areas in which case-specific analyses are done and which might offer models for § 316(b) decisionmaking. Moreover, the NERA report does not evaluate the specific aspects of EPA's BEN model or the government's current approach to calculating natural resource damages. In fact, UWAG has significant concerns about the BEN model and has expressed these concerns to EPA in the past. Rather, the NERA presentation is offered only to show that site-specific analyses can be developed using a "tiered" approach so that the level of analytical effort need not be the same for every site.

With that important qualification, UWAG commends to EPA the points concisely made in the NERA report/presentation. It recommends a "tiered approach" depending on the complexity of the site and the cost of the proposed intake technologies. A relatively simple benefit-cost study (a "formulaic" analysis) would be called for at simple sites with an inexpensive array of technology options, and a more complex study recommended in other situations. A series of examples illustrates in principle how benefit-cost analysis would work for § 316(b) decisions.

The NERA report/presentation addresses EPA's BEN model for calculating noncompliance benefits. In this program, noncompliance benefit penalties are determined with a tiered approach, with smaller and less complex violations resolved, ordinarily, without complex analysis or litigation. A "rule of thumb" estimate is made by taking five percent per year of the delayed one-time capital costs for the period of noncompliance; if it is less than $10,000, the penalty is simply set at that amount. If it is over $10,000, the penalty is calculated by the BEN computer model. Where the BEN model does not resolve the penalty issue, a more complex, case-specific financial analysis may be used in negotiation or litigation.

The NERA report/presentation also summarizes how a two-tiered approach (Type A and Type B) is

used in valuing natural resource damages under CERCLA. Type A procedures, used for smaller and less serious releases of hazardous substances, are relatively low-cost and use a computer model. Guidelines are provided on when to use Type A and when to use Type B procedures. There is a "safety valve" in that, if potentially responsible parties are concerned about inaccuracies in the Type A procedures, they can choose a Type B assessment, which is based on site-specific input data and custom models.

In conclusion, NERA recommends that EPA develop a tiered system that allows for site-specific benefit-cost analysis without requiring costly procedures in every situation; that it create well-defined metrics to indicate when each different type of benefit-cost analysis is warranted; that it provide a "safety valve" for situations in which the "typical" regulatory approach is not appropriate; and that it solicit input on all aspects of the § 316(b) rule and maintain strong lines of communication with interested parties. To this end, EPA should define the specific elements of a § 316(b) benefit-cost analysis; begin developing computer models that use predetermined data and model specifications to assess costs and benefits of cooling water intake alternatives in relatively simple cases; and begin to develop procedures for more complex situations.

EPA Response

EPA has fully considered the comment that a tiered approach to determining BAT, that allows for site specific cost-benefit assessments is preferred. In response, EPA has rejected a cost-benefit approach to the final rule because for new facilities EPA believes that it is appropriate to interpret the statute as authorizing a technology-based approach. See response to comments 316bNFR.068.007 and 316bNFR.0068.008 and the preamble to the final rule.

For the final rule EPA selected best technology available for minimizing adverse environmental impact on the basis of environmental performance of technologies determined to be economically practicable. Further, the rule establishes technology-based performance requirements, based on a two-track approach. Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit applicant to select and implement design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged adult and juvenile fish. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will result in the same level of reduction of impingement and entrainment at the cooling water intake structure as would be achieved under Track I. Track II also requires the applicant to meet the same proportional flow requirements that apply in Track I. EPA believes that the two-track approach allows for the consideration of site-specific costs and benefits and will ultimately result in the efficient and appropriate application of the best technology available for minimizing adverse environmental impact.

Comment ID 316bNFR.704.005

Author Name	David E. Bailey
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Subject Matter Code OPP

General Statement of Opposition

One of the lessons in the record that the EPA has compiled in this rulemaking is that the present implementation of § 316(b), relying on case-by-case evaluation, appears to be working fairly well. By and large, cooling water intake structures are not causing "adverse environmental impact." The "benefit" to the environment of changing the existing regulatory regime, then, probably approaches zero.

EPA Response

One reason that the benefits assessment for new facilities is "low" is that all but a few (nine) of the 121 projected new facilities are planning to install a cooling tower independently of this rule. With respect to the other nine facilities, it is somewhat speculative to predict the exact water body on which they will locate to predict benefits. EPA will, based on case studies, be able to quantify more fully the economic benefits of the various technologies in the existing facility rule. Nevertheless, as discussed elsewhere, EPA believes the technology-based approach is reasonable and provides certainty for new facilities.

The Track II approach to comply with today's standard allows individual facilities to decide how to meet the standard on a case-by-case basis. Consequently, it continues the present § 316 (b) implementation process. EPA disagrees with the commenter's assertion that cooling water intake structures are not causing "adverse environmental impact." See section III of the preamble for a discussion of environmental impacts associated with cooling water intake structures.

Comment ID 316bNFR.704.006

Author Name	David E. Bailey
Organization	Utility Water Act Group (UWAG) c/o Hunton & Williams

Subject Matter Code 9.46

Request for Comment: Consideration of Nonaquatic Impact

The cost of imposing heavy new technology requirements (construction of cooling towers, for example) on generating facilities is large in terms of dollars, as the record now shows, and may have harmful environmental impacts as well, such as unsightly plumes, noise from fans, air pollution, and land that must be dedicated to the building of towers. We have mentioned in this letter additional economic impacts, including transitional costs, that may arise from changing the existing water use regime suddenly.

EPA Response

See responses to comments 316bNFR.014.019 and 316bNFR.068.100.

Comment ID 316bNFR.704.007

Author Name	David E. Bailey
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Subject Matter Code 9.47

Definition of AEI Based on Population Modeling or Other Biological Criteria

The rulemaking record also shows that there is uncertainty in assessing environmental impact and that applying § 316(b), especially to new facilities, will involve an assessment of risk. UWAG has therefore suggested that EPA's own Guidelines for Ecological Risk Assessment play a role in § 316(b) decisions.

EPA Response

EPA agrees that there is considerable uncertainty associated with assessing impacts to aquatic organisms. EPA considered and applied ecological risk assessment concepts when developing today's interpretation of AEI. Specific ecological endpoints that were considered included individuals, populations, and communities.

Comment ID 316bNFR.704.008

Subject Matter Code 21.0

Cost/Benefit Analysis

Author Name David E. Bailey

Organization Utility Water Act Group (UWAG) c/o Hunton & Williams

UWAG has tried to show that, by taking a "tiered" approach that develops relatively simple benefit-cost analysis methods for simple situations and more elaborate methods for more complicated sites, § 316(b) decisions can be made without inordinant time and effort. Benefit-cost analysis can be used without necessarily requiring an elaborate and time-consuming study at each and every site. And for many sites, no benefit-cost analysis will be needed at all, especially if EPA uses the "two track" approach that UWAG has recommended.

EPA Response

This comment reiterates the points made in a previous comment. Please see the response to comment number 316bNFR.704.004.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Rich Cogen

On Behalf Of:

Ohio River Advocacy

Author ID Number:

316bNFR.705

Comment ID 316bNFR.705.001

Subject Matter Code OPP

General Statement of Opposition

Author Name Rich Cogen

Organization Ohio River Advocacy

Water quality problems continue to plague the Ohio River and all waterways within its watershed. Some progress has been made in some areas of water pollution; however, the status of water quality is now at a critical juncture in time. Sound river management practices are increasingly being sacrificed for commercial and political reasons. Without reversal of this apparent trend, the water quality of the river and waterways in the Basin will likely deteriorate from current levels.

We have recently been apprised of the public notices concerning the proposed water intake rule. The most recent Public notice reopened the comment period for 6 documents and the issues associated with these documents. The associated issues of entrainment, impingement, and general impact on fish communities are issues discussed by the Clean Air Task Force in its comments of July 2, 2001 (copy enclosed). Rather than repeat those continents, they are hereby incorporated by reference to this letter, and ORA agrees and concurs with the statements, comments, and positions as set forth in that document (copy enclosed).

Clearly, the use of a standard other than BTA is arbitrary and capricious. If EPA elects to chose the protocol as proposed in the draft rule the practical result will be a restriction on the degree of certain aquatic populations to continue to recover.

[see original document or 316bNFR.703 for referenced comments by Clean Air Task Force]

EPA Response

EPA believes that the final rule will allow certain aquatic populations to continue to recover.

Comment ID 316bNFR.705.002

Subject Matter Code OPP

General Statement of Opposition

Author Name Rich Cogen

Organization Ohio River Advocacy

The Ohio River is a threatened but recovering waterway that still has many pollution problems; however, with many facilities utilizing this resource for water intake purposes the ramifications of implementation of this proposed rule are potentially threatening to the vitality of resident fish populations. I have been advised that DCN# 2-017A & All References Memo Re: Ecological Reasons Why Freshwater River and Reservoir Ecosystems Do Not Normally Experience Substantive Impact As A Result of Impingement and Entrainment (April 27, 2001), fails to consider the cumulative effect of numerous intakes on resident populations of aquatic species. If this is in fact the case, we are concerned that the memo does not address intakes in the number and volume that they are present on the Ohio River. Therefore, there may be little relevance of that memo and the other documents to support any decision by EPA to promulgate any rule weaker than BTA and/or that suggested by the Clean Air Task Force. Any decision to the contrary, whereby EPA relies upon insufficient and/or irrelevant data and science may be arbitrary and capricious.

EPA Response

EPA is aware of the cumulative intake of numerous intake structure on resident populations of aquatic species. However, EPA believes that the BTA standard based on the in entrainment and impingement achievable using wet cooling with recycle will reduce future entrainment and impingement and thereby significantly reduce the population losses by resident aquatic species. See discussion of benefits in the preamble and in The Technical Development Document.

Comment ID 316bNFR.705.003

Subject Matter Code OPP

General Statement of Opposition

Author Name Rich Cogen

Organization Ohio River Advocacy

We hope that in its final deliberations, EPA will recognize that its proposed rule would establish criteria and product usage that would create a complex rule with various performance and technology standards. It would also violate the BTA requirement of Section 316 of the CWA.

EPA Response

See response to comment no. 316bNFR.069.002 and the preamble to the final rule.

Comment ID 316bNFR.705.004

Subject Matter Code OPP

General Statement of Opposition

Author Name Rich Cogen

Organization Ohio River Advocacy

If a waterbody is to attain its best water quality possible, and the resulting improvement in aquatic species populations is to occur, then habitat improvement is necessary. As you know, through the TMDL program and other programs and initiatives, there are efforts underway nationwide to achieve these goals. However, a water intake is not, per se, a habitat improvement. Thus, deployment of any intake that is any less than BTA may prove an impediment to a waterbody's rehabilitation. A universal performance or technology standard acknowledges this fact; <fn1> whereas, a waterbody specific criteria would not. Therefore, ORA is concerned about the negative impacts of less than BTA water intakes upon waterbody rehabilitation, and protection in the Ohio River basin.

Footnotes

1 A universal standard may also result in less transaction costs (e.g., enforcement, permitting, compliance, etc.)

EPA Response

EPA agrees that impingement and entrainment is one form of adverse environmental impact. EPA's final rule for CWISs does not allow compliance using less than BTA equivalent technology. See the preamble for a complete discussion of the two track approach adopted by EPA.

Comment ID 316bNFR.705.005

Subject Matter Code 10.11

Request for Comment: Dry Cooling--Proposed Option

Author Name Rich Cogen

Organization Ohio River Advocacy

The selected technology or performance standard must reflect, without reference to cost, the best available means for minimizing adverse environmental impact. Dry cooling is commercially widely available and is used efficiently throughout the world. Because dry cooling uses negligible amounts of water, it is the most effective technology for avoiding the impingement or entrainment of fish and other aquatic organisms. Accordingly, ORA strongly urge EPA to designate dry cooling or its functional equivalent as the best technology available under Section 316(b) of the Clean Water Act.

EPA Response

See responses to comments #316bNFR.206.014 and #316bNFR.053.010.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

Douglas Dixon

On Behalf Of:

Electric Power Research Institute (EPRI)

Author ID Number:

316bNFR.801

Note

No comments coded for this letter. Submission duplicates a previous comment (316bNFR.701) but included hard copies of the attachments.

Comment ID 316bNFR.801.001

Subject Matter Code DELETE

Record deleted, merged, or otherwise edited out

Author Name Douglas Dixon

Organization Electric Power Research Institute (EPRI)

No comments coded for this letter. Submission repeats previous comment (316bNFR.701) but included hard copies of the attachments.

[see original document for attachments]

EPA Response

No Response Necessary.

Response to Public Comment

---National Pollutant Discharge Elimination System---
Regulations Addressing Cooling Water Intake Structures
for New Facilities

(40 CFR Parts 9, 122, 123, 124, and 125)

Response to Comments Submitted by:

David K. Gordon & Reed W. Super

On Behalf Of:

Riverkeeper

Author ID Number:

316bNFR.802

Comment ID 316bNFR.802.001

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

To avoid compliance costs, industry uses the statutory phase "adverse environmental impact" to argue that massive aquatic mortality cannot be regulated under Clean Water Act section 316(b) until a particular facility threatens a fish population's ability to sustain itself. Demonstrating the myriad ways impingement and entrainment harms ecosystems in each permitting proceeding is not required by law, and is impractical, as a threshold to regulation. The proper focus should be on minimization of adverse impact.

EPA Response

EPA agrees that the focus of today's rule should be on use of best technology available to minimize any AEI. According to the legislative history of the Water Pollution Control Act Amendments of 1972 (93rd Congress, first session @ 264 [1973]), "Section 316(b) requires that the location, design, construction, and capacity of cooling water intake structures of steam electric generating plants reflect the best technology available for minimizing any adverse environmental impact." EPA believes that today's rule reflects this focus. See the preamble to the final rule.

Comment ID 316bNFR.802.002

Subject Matter Code 9.4

Adverse Environmental Impact

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

The withdrawal of water from the nation's waterways to cool industrial facilities kills billions of adult and larval fish each year. USEPA promulgation of categorical rules defining the best technology available to minimize adverse environmental impact could standardize and improve the control of such mortality. However, in an attempt to avoid compliance costs, industry has seized on the statutory phrase "adverse environmental impact" (AEI) to introduce significant procedural hurdles and layers of uncertainty in the permitting of cooling water intakes under the Clean Water Act. These include, inter alia, a requirement to prove that a particular facility threatens the sustainability of an aquatic population as a prerequisite to regulation. Such claims have no foundation in science, law or the English language. Any nontrivial aquatic mortality constitutes AEI, as EPA has proposed and several state and federal regulatory agencies have properly acknowledged. The focus of scientists, lawyers, regulators, permit applicants, and other interested parties should not be on defining AEI, but rather on minimizing AEI, which requires minimization of cooling water withdrawals.

EPA Response

EPA agrees that it can be difficult to accurately assess population level effects in many cases and has documented some of the weaknesses and uncertainties associated with evaluating fish populations (see section VI.B.2.c of today's preamble). Today's rule focuses on use of best technology available to minimize any AEI (see response to comment 316bNFR.802.001).

Comment ID 316bNFR.802.003

Subject Matter Code	9.3
Documentation of I & E Impacts	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Steam electric generating facilities use water for cooling, in particular to condense the steam used to drive the turbines. Some power plants withdraw hundreds of millions or billions of gallons of river, lake or ocean water per day. <fn1> These plants and all other significant users of cooling water harm and kill large numbers of fish and other aquatic biota <fn2> through impingement <fn3> and entrainment. <fn4> In the early 1970s, a number of well-publicized massive fish kills occurred at U.S. power plants, such as the Brayton Point Power Station in Mt. Hope Bay, Massachusetts, which killed and mangled an astonishing 164.5 million menhaden and river herring in just one day, July 2, 1971. <fn5> In 1972, the U.S. Congress mandated in the Federal Water Pollution Control Act (Clean Water Act or CWA) that cooling water intake structures (CWISs) use the best technology available for minimizing such adverse environmental impact. <fn6>

Footnotes

1 The nation's largest user of cooling water, the Salem Nuclear Generating Station in New Jersey, withdraws 3.024 billion gallons of water each day from Delaware Bay.
2 For brevity, this paper uses the word "fish" to denote "fish at all life stages and other aquatic biota," unless the context clearly indicates otherwise.
3 Impingement is the trapping of adult or larger juvenile fish against an intake's screening devices.
4 Entrainment is the drawing of small fish, eggs, larvae, and other organisms through a cooling water intake structure into the plant's cooling system and heat exchanger.
5 USEPA, Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact, 1976 at p. 9, table I-3. The Mt. Hope Bay estuary forms the northeast arm of Narragansett Bay.
6 Clean Water Act section 316(b); 33 U.S.C. § 1326(b), which provides:

Any standard established pursuant to [Section 301 or Section 306 of the Act] and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

EPA Response

EPA agrees with the commenter that plants withdrawing millions to billions of gallons of water a day kill large numbers of fish and aquatic organisms through impingement and entrainment. EPA also agrees that cooling water intakes must apply the best technology available for minimizing adverse environmental impact. This is the purpose of today's technology based rule.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comments 316bNFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the Preamble.

Comment ID 316bNFR.802.004

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Subject Matter Code 6.1

Current Implementation of Sec. 316(b)

Unlike other sources of degradation to aquatic ecosystems controlled under the 1972 Clean Water Act amendments, however, cooling water intake structures have uniquely avoided nationally uniform limitations. Instead, regulation of cooling water intake structures has long been relegated to ad hoc determination by individual permit writers exercising best professional judgment. This lack of categorical standards has resulted in uneven and conflicting regulation as well as enormous, unnecessary aquatic mortality, which runs contrary to the goals of the Clean Water Act and the direct mandate of Section 316(b). The individualized assessments have typically relied on narrow and inaccurate population models and ignored other impacts on ecosystem health.

EPA Response

Today's rule provides national standards for cooling water intake structures, while allowing for site-specific applications when they are warranted, therefore fostering the CWA's objectives while allowing a flexible mechanism for implementing the protective standards of today's rule. See today's rule preamble for a discussion on the basis of these standards, specifically, section V. For implementation issues, see section VII.

Comment ID 316bNFR.802.005

Subject Matter Code	2.3
	Legal/Regulatory History

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

Congressional Intent in Enacting Section 316(b) to Minimize AEI.

Congress enacted section 316(b) as part of the Clean Water Act amendments of 1972 in response to a number of well-profiled massive fish kills at power plants in the early 1970s. For example, in 1969 and 1970, the P.H. Robinson plant in Galveston Bay, Texas impinged more than 7 million fish in 12 months, and the Indian Point No. 1 nuclear facility on New York's Hudson River killed 1.3 million fish over a 10 week period. In the late summer of 1971, more than 2 million dead menhaden clogged the screens at the Millstone plant in Niantic Bay, Connecticut. On July 2, 1972 the Brayton Point Power Station in Mt. Hope Bay, Massachusetts killed 164.5 million menhaden and river herring. <fn7> In fact, during debate over the Clean Water Act, Senator Buckley cited with approval two newspaper articles reporting a decision of the Atomic Energy Commission (AEC) to require Consolidated Edison to install closed cycle cooling at Indian Point. <fn8> The articles noted that the plants withdrew massive amounts of water from the Hudson River, entraining thousands of organisms per minute, and that the AEC had ordered Con Ed to stop removing such large volumes of water from the River and to install cooling towers in order to abate these massive fish kills. <fn9>

The structure of the Clean Water Act indicates how Congress intended the section 316(b) "best technology available" (BTA) standard for minimizing adverse environmental impacts to be implemented. The Act prohibits all discharges of pollutants to waters of the U.S. except as permitted in a National Pollutant Discharge Elimination System (NPDES) permit. <fn10> EPA establishes industry-wide, nationally-uniform, technology-based control standards, without regard to site-specific water parameters (such as receiving water quality) to govern the setting of individual NPDES permit limitations. <fn11> Once established by EPA, these national, technology-based standards must be incorporated into every individual NPDES permit issued nationwide. The goals of technology-based standards are to bring all plants up to state-of-the-art pollution control as quickly as possible (sometimes referred to as "technology forcing") and to ensure national consistency in NPDES permit limitations. <fn12>

Congress chose the NPDES permitting program as the vehicle for minimizing adverse environmental impact by making the provisions of § 316(b) applicable to any facility containing a point source. <fn13> Section 316(b)'s explicit cross-reference to sections 301 and 306 further clarifies that cooling water intake standards are an integral component of the NPDES technology-based regulations. <fn14> As a result, EPA must promulgate national technology-based regulations specifying BTA for minimizing adverse environmental impact, as it does for effluent limitation under sections 301 and 306. <fn15> This integration, along with the spare and direct "best technology available" mandate, clearly indicates Congressional intent that EPA set nationwide technology-based standards for cooling water intake structures in the same fashion as for chemical pollutants. Such standards apply to permittees across the board, despite potential claims by regulated parties that their individual discharges – or cooling water intakes – do not cause substantial ecological impact.

Footnotes

7 New York Times Abstracts, August 16, 1972, p. 41, col. 1 ("massive fish kill in Apr at Millstone Point nuclear power complex"); New York Times Abstracts, May 24, 1972, p. 94, col. 1 ("alleged 'massive' killing of fish at [Con Ed's] No. 2 nuclear-power plant at Indian Point on the Hudson River"); New York Times Abstracts, March 1, 1972, p. 77, col. 3 ("more than 100,000 fish have been killed in last wk [at Indian Point]"); Clark and Brownell, Electric Power Plants in the Coastal Zone: Environmental Issues (1973), p. V-8, tbl. V-B.
8 Senate Com. on Pub. Works. A Legislative History of the Water Pollution Control Act Amendments of 1972, 93d Cong., 1st Session, at 196-197 (1973.) See also In the Matter of: Carolina Power & Light Company (Brunswick Steam Electric Plant), USEPA, Decision of the General Counsel, EPA GCO 41 (June 1, 1976) at fn. 10.
9 Id.
10 CWA § 301(a); see also CWA § 402 (NPDES program).
11 See 40 C.F.R Parts 402-699. In waters which violate ambient quality standards, a more restrictive set of limitations may apply. See 33 U.S.C. §§ 1312, 1313, 40 C.F.R. Parts 130-131.
12 A primary objective of Congress in implementing nationally applicable standards was to avoid the "race to the bottom," which commonly occurred in the absence of uniform national effluent limitations prior to the adoption of the Act, where states would compete to attract and maintain industries by relaxing control requirements. See Hines, Controlling Industrial Water Pollution: Color the Problem Green, 9 B.C. Indus. and Comm. L. Rev. 553, 573 (1968); Grad, Treatise on Environmental Law, v.2, § 303[a-1].
13 33 U.S.C. § 1326(b).
14 Section 301 mandates the "best available technology" for existing sources while the section 306 new source performance standard must reflect the "best available demonstrated control technology." Congress' use of substantially similar statutory language in Section 316(b) underscores its intent to incorporate that section's limitations into the categorical standards of sections 301 and 306:

[T]he regulations issued under § 316(b) are … closely related to the effluent limitations and new source performance standards of §§ 301 and 306… It bears emphasis that § 316(b) … requires § 301 and § 306 standards to deal with cooling water intake structures…. [The] regulations [are] issued at least in part under the same statutory sections, some of which limit intake structures, others, effluent discharges.

Virginia Electric and Power Company v. Costle ("VEPCO"), 566 F.2d 446, 450 (4th Cir. 1977); see also Cronin v. Browner, 898 F.Supp. 1052, 1059 (S.D.N.Y. 1995).
15 See October 10, 1995 Consent Decree, Cronin v. Browner, No. 93 Civ. 0314 (AGS), as amended March 27, 2000; VEPCO, 566 F.2d at 450.

EPA Response

In this rule, EPA has promulgated national technology-based regulations specifying BTA for minimizing adverse environmental impact. EPA has considered the technical availability and economic practicality along with other factors in establishing the requirements of this rule and in rejecting regulatory alternatives to the ones established in this rule. See the preamble to the rule for a discussion of EPA's interpretation of the legal basis for this new facility rule.

Comment ID 316bNFR.802.006

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper

Plain Meaning of the Phrase "Adverse Environmental Impact."

In its plain and ordinary meaning, the phrase "adverse environmental impact" refers to any negative effect on any aspect of the environment, and clearly encompasses non-trivial aquatic mortality. The dictionary definitions of each word in the phrase bear that out. "Adverse" means "unfavorable or antagonistic" <fn16> "Environment" means "the air, water, minerals, organisms and all other external factors surrounding and affecting a given organism at any time." <fn17> "Impact" means "influence; effect." <fn18> Thus, anything that affects the environment in a negative way has an adverse environmental impact.

Artificially induced wildlife mortality is clearly within the plain meaning of AEI. Animals (including aquatic biota) are an integral part of the environment, and killing them clearly has an impact which is not beneficial (unless, perhaps, the only species affected is unequivocally a nuisance).

In a gambit to create an additional technical and procedural hurdle to effective regulation, industry insists that permitting agencies must pointedly define AEI at some threshold level of ecological damage for each individual application. <fn19>

The contention is inconsistent with the structure of the Clean Water Act and the statutory language. There is no need or sound reason to precisely define a level of acceptable impact, or ascertain the level of unnecessary killing before destabilization of population, to implement the statutory requirement to "minimize adverse environmental impact." <fn20>

This unremarkable and (in most cases) relatively simple injunction is directly analogous to the modifier "control" for discharge standards under section 306 of the Act. Both terms define the respective purpose of the technology (in each case required to be the best available): to control pollutant discharges under section 306 and to minimize ecological damage due to cooling water withdrawals under section 316(b). In other words, they supply the answer to the question, "Best technology for what?" which is basic to the meaning of the respective sections. There is nothing in the statutory language that requires a separate determination of some supposed level of AEI, or a self-defeating assessment of how much unnecessary killing it will take to push a population into long term decline, before a permitting agency can minimize the damage. <fn21>

Notably, section 316(b) contains no threshold adjective such as "significant adverse environmental impact." That stands in marked contrast to the similar language Congress used three years earlier in the National Environmental Policy Act of 1969 (NEPA). NEPA requires preparation of an environmental impact statement (EIS) for every major federal action "significantly affecting the human environment." <fn22> Thus, while both statutes address environmental impacts, in NEPA the significance of the impact is a threshold requirement for the EIS requirement. Conversely in section 316(b), the threshold requirements are that there must be a cooling water intake structure and a point source. Once those threshold requirements are met, the facility must use BTA for minimizing AEI.

Any other construction improperly reads requirements into the statute which are not in the text, and substantially complicates administration.

Footnotes

16 Random House Webster's College Dictionary (1999). In the environmental law context, "adverse" is often used as the opposite of "beneficial."
17 Random House Webster's College Dictionary (1999).
18 Id.
19 July 11, 2000 letter from Utility Water Action Group Cooling Systems Committee Chair David Bailey to OMB Office of Information and Regulatory Affairs Deputy Administrator Don Arbuckle, at 2, attached to July 11, 2000 letter from Kristy A.N. Bulleit to EPA Office of Science and Technology Director Geoffrey Grubbs. See also, Comments of the Utility Water Action Group on EPA's Proposed Section § 316(b) Rule for New Facilities and ICR No. 1973.01, November 9, 2000 ("UWAG Phase I Comment"), at 53-72.
20 Industry and other parties have at times framed the debate as whether the Clean Water Act addresses "population level" impacts or "individual" fish. See e.g UWAG Phase I Comment at 58-68. The dichotomy is false and unhelpful. Neither the Act nor fisheries advocates maintain a serious interest in the survival of an individual fish, or even more absurdly, an individual larva. Cf. UWAG Phase I Comment at 60. This obvious fact does not, however, justify requiring demonstration of measurable population decline or, even worse, "unacceptable risk to the population's ability to sustain itself," id. at 65, as a threshold for regulating the cooling water intake at all. Notably, as a further threshold, UWAG would require a showing that the population decline "is attributable to the operation of the cooling water intake structure." Id.
21 EPA's proposal to set a de minimis 2 million gallon per day withdrawal threshold, below which the national regulation would not apply, avoids burden to facilities where the impact is negligible. See 65 Fed. Reg. 49059, 49094 (August 10, 2000).
22 42 U.S.C. § 4332.

EPA Response

See responses to comments 316bNFR.802.002, 316bNFR.068.007, and 316bNFR.068.008. For a discussion of EPA's authority to establish regulatory thresholds, see the preamble and other portions of this comment response document.

Comment ID 316bNFR.802.007

Subject Matter Code	9.3
Documentation of I & E Impacts	

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Organization Riverkeeper

Adverse Environmental Impacts of Cooling Water Intake Structures.

The withdrawal of large quantities of water by cooling water intake structures causes adverse environmental impact in a variety of familiar ways. First, such withdrawal impinges and kills adult fish, eliminating their availability for a number of important functions. Human fishers can no longer catch these fish commercially or recreationally, or for sustenance; all opportunities for observation, appreciation, photography, nature study or research, are lost as well as the potential for pecuniary profit associated with any of these uses. Ecologically, the lost fish become unavailable as prey for wildlife higher on the food chain, such as birds, mammals, and larger fish, or to serve as predators for pest insects such as mosquitoes.

Entrainment kills young fish, eggs, larvae, and smaller aquatic life such as plankton by the tens or hundreds of millions. The young fish are thus prevented from maturing to adulthood (where they would provide the benefits discussed immediately above) or even maturing to the next life stage. The vast majority which would have perished before maturity, would have contributed to the aquatic ecosystem by consuming prey and ultimately providing fodder for a predator. Because of their death by entrainment, however, they are prevented from doing so. Their contribution to the ecosystem is converted from the natural, varied process which unfolds over time to one in which all of the entrained biota immediately become detritus for decomposers. One result is that energy is transferred down the food chain from higher predators to lower decomposers.

Entrainment and impingement thus disrupts the natural function of the ecosystem, which includes fish, smaller aquatic organisms, insects, birds, mammals and plant communities. This may broadly alter the nature, structure and function of the ecosystem, or may damage the sustainability of one or more of its species. Stresses for a particular species may include population decline, reduced prey, more difficulty locating adequate sustenance, or suffering a greater number of pests, etc.

Accurately defining and assessing all of these ever-changing interactions in an ecological community or ecosystem, and determining the impact of extraneous man-made and environmental factors changing over time is not feasible, especially within the constraints of a permitting proceeding. Apparent stability or robustness in a population may not reflect the impact of significant environmental stresses. A fish population in decline may be being bolstered by migrants from other communities, so that the stressors on the community go unnoticed. Also, populations may stabilize at a lower equilibrium level than would be the case absent cooling water intake mortality. Further, if some percentage of a fish population or community is killed by CWISs, the loss of fish to other causes, both natural and man-made, will aggregate to cause greater cumulative impacts. Thus, an impact that would have been trivial can become significant because power plants consumed the reserve margin which would have allowed the population to withstand the other impact.

EPA Response

EPA agrees with the commenter that cooling water intake structures not only cause substantial mortality within the aquatic ecosystem through impingement and entrainment, but the impact from these intakes affects the viability of aquatic resources in other ways including disrupting the natural functioning of the ecosystem. EPA is also concerned about the cumulative impacts of multiple stressors on aquatic systems including depletion of a population's compensatory reserve which can threaten that population's ability to persist in the face of the many natural and anthropogenic environmental stresses that occur. Further, EPA does not believe that cooling water intakes have an inherent right to deplete the potential compensatory reserve of fish populations.

For additional discussion about EPA's concerns regarding loss of aquatic organisms due to cooling water intakes please see Response to Comments 316b.NFR.529.301, 316bNFR.056.005, 316bNFR.068.050, and sections III and VI.B of the Preamble.

Comment ID 316bNFR.802.008

Subject Matter Code	9.4
Adverse Environmental Impact	

Author Name David K. Gordon & Reed W. Super

Organization Riverkeeper

The confusion of minimization of adverse environmental impact with fisheries management.

Environmental law distinguishes between killing wild organisms for food (hunting and fishing) and pointless killing, for example as a by-product of industrial processes. Harvesting of plants and animals for food is fundamental to survival, so the law tolerates the ecological impacts resulting therefrom (such as reduction in size of wild populations) to a substantial extent. Recreational taking of organisms is also accepted and encouraged in many instances as a social good. Typically, regulation of such activities as hunting and fishing attempts to maximize the availability of such prey by balancing the permitted take with the long-term stability of the population. <fn23> The science of fisheries management focuses on the sustainability of populations, so as to allow fishers and consumers to benefit from a continuous harvest.

A critical basis for industry's approach to section 316(b), and its interpretation of AEI in particular, is the inclusion of BTA regulation within the framework of fisheries management – essentially equating entrainment and impingement with fishing. It asserts, "[b]ecause entrainment and impingement are forms of harvesting which (upon conversion to equivalent adults) are analogous to fishing, the methods used by fisheries scientists to evaluate the impacts of proposed harvesting regimes also can be used to evaluate the potential impacts of CWISs." <fn24> Despite industry's brazen and self-serving claim, we do not know of any federal or state governmental body, legislative, executive or administrative, which considers the wasteful and unnecessary killing of aquatic biota as a socially beneficial harvest. Allocation of scarce fishery resources to cooling water intake mortality and away from fishers is almost unthinkable in any area of the U.S. with declining or restricted populations and depressed fishing communities.

Nothing in the Clean Water Act reflects an intent to manage collateral industrial impacts on aquatic ecosystems as a sustainable harvest. Congress's requirement to use the best technology available to minimize adverse environmental impact sets forth a dramatically different protective standard from, for example, the Magnuson Stevens Act provision enacted just four years later to allow "on a continuing basis, the optimum yield from each fishery." <fn25> Other than the explicit variance for thermal discharges in section 316(a), <fn26> the Clean Water Act and the NPDES program in particular represent a marked Congressional determination to regulate industrial discharges and cooling water withdrawals through technology-based standards rather than by ecological assessment.

Footnotes

23 See e.g. Magnuson Stevens Fishery Conservation and Management Act § 301(a)(1); 16 U.S.C. § 1851(a)(1) ("Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.")

24 UWAG Phase I Comment at p. 66.

25 16 U.S.C. § 1851(a)(1)

26 Despite industry's longstanding and oft-repeated insistence, see e.g UWAG Phase I Comment at 16-20, neither the inclusion of cooling water intake regulation in section 316 nor the legislative history of the Clean Water Act indicates Congressional intent to regulate intakes according to the explicit ecologically-based variance for thermal discharges in section

316(a). First, the plain language of section 316(b), "best technology available to minimize adverse environmental impact" bears no similarity to the 316(a) variance where "the effluent limitations [are] more than necessary to assure the [protection] and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made…" and does not contemplate such ecological calculation. Instead, the BTA standard is much more comparable to the best available technology standards of sections 301 and 306. Moreover, the factors that led Congress to enact the section 316(a) variance for thermal discharges do not apply to fish mortality caused by entrainment and impingement. In the hearings on the Clean Water Act Congress heard "extensive and detailed testimony" about the "unique characteristics of heat as a pollutant," including its ability to "dissipate quickly, result in only local and temporary effects and…benefit the environment under circumstances." W. Anderson, II and E. Gotting, Taken In Over Intake Structures? Section 316(b) of the Clean Water Act, 26 Colum. J. Envtl. L. 1, 83-86. None of these unique characteristics of thermal pollution, are shared by industrial fish kills, particularly on a large scale.

EPA Response

See response to comment 316bNFR.802.002.

Comment ID 316bNFR.802.009

Author Name David K. Gordon & Reed W. Super
Organization Riverkeeper

Subject Matter Code 9.47
Definition of AEI Based on Population Modeling or Other Biological Criteria

Industry's Use of Population-Based AEI Models To Avoid Minimizing Fish Kills.

Section 316(b) determinations have typically involved individualized ecological assessment and determination of best technology available for each proposed or renewed cooling water intake structure. The multiplicity of these individual determinations and the combination of ecological and mathematical/statistical expertise necessary to determine the complex population dynamics for individual species has granted industry a critical strategic advantage because of superior resources in these proceedings. Industry's insistence on some arbitrary threshold of adverse environmental impact further tips the scales in its favor by requiring a detailed ecological assessment simply to subject the cooling water intake structure to the fundamental minimization requirement in section 316(b).

Industry's most common analytical tool in these individualized technical determinations are density-dependent models of fisheries populations. Cooling water users have for decades used arguments based on density-dependence to justify the wholesale destruction of large numbers of fish and crustaceans via impingement and entrainment at their CWISs. Density-dependence, in general, is unremarkable natural adjustment in an animal population's birth, death or survivability rates to maintain equilibrium despite potential increases or decreases population levels. A population will continue either increasing or decreasing unless at least one of these rates is density-dependent at some life stage. Mathematical models of density dependent compensation will predict relatively stable populations despite severe anthropogenic mortality.

In many critical cases these models have been misapplied. The generalized assumption typically used to justify applying such models rarely depends on an explanation or demonstration of the actual existence of any compensation mechanism. Industry consultants utilize models derived from fisheries management studies despite the obvious difference that entrainment losses are overwhelmingly of fish in early life stages while commercial fishing harvests adult fish. Density-dependence, even where it influences a fishery population, may operate at a life stage other than that which compensates for entrained larvae, i.e. the development of young-of-year. Moreover, fish population levels may be controlled by density-dependent compensation mechanisms under environmental conditions and during periods of relative abundance and be governed by non-density dependent controls under different conditions.

Even worse, typical compensation analysis relies on an ecologically baseless concept of "surplus production." It dismisses the ecological value of the tens of millions of fish which are a critical base of the food chain whether or not they grow to adulthood – even though their predators may be populated at far below their historic values. It narrowly focuses on the larval fish only as potential adults for individual species, rather than as forage for small predators in varied parts of the larger food web. By killing off forage, power plants create the very mechanism – food limitation – which is among the most likely to lead to the density-dependence they may assert for any particular species. Nevertheless, "the appealing, yet narrow, perspective of the surplus production concept … has allowed us to justify, perhaps blindly, prosecution of fisheries." <fn27> Prof. Boreman notes:

If a "surplus" is being removed by power plant operations, then something else in the ecosystem is being out-competed. Use of surplus production is essentially an allocation issue among competitors for that resource. Do we use it for supporting fisheries, for allowing the population to hedge against bad times, for providing extra sustenance for natural predators, or for supporting other uses of the resource? <fn28>

Moreover, these density-dependent models have no explanation for why fish would have evolved to create surplus production. High fecundity places great demands on individual fish and natural selection would have reduced their fecundity if some portion of their eggs were truly surplus. Rather, high fecundity has a reproductive purpose in that it serves to maintain population levels in light of multiple, variable stressors, such as climatic, environmental and other natural causes of mortality. If power plants consume all of the seemingly-excess offspring, then the surviving class will be exceedingly vulnerable to other stressors, which they might otherwise have been able to endure. What constitutes surplus production in one year may be needed the next to counteract changes in environmental conditions that affect cohort survival. <fn29>

Ironically, this presumption of overwhelming compensation for the species of fish entrained by cooling water intake structures is the only critical ecological feature that the power industry and their consultants assume is universal, not subject to the requirement of individualized determination. An applicant's burden of proof, especially for the counter-intuitive notion that the destruction of large numbers of fish is "ecologically irrelevant" should typically require greater a greater showing of density-dependence than has been typically required to date. <fn30>

Some of the models utilized by industry make density dependence seem inevitable because they mathematically derive compensatory mechanisms based on almost any input. For example, in the joint permit renewal of three of the power stations on the Hudson River, the applicants relied on a striped bass model based on Beverton-Holt functions which assume a priori strong compensation during early life stages subject to entrainment. <fn31> The model effectively derives density dependent results from environmental variation and other non-density dependent factors which may well actually control the population. The independent consultant hired by New York State to review the Draft Environmental Impact Statement prepared by the applicant for the permit renewals concluded:

We believe the striped bass modeling results and conclusions…are unreliable due to limitations of the data, modeling of data and model assumptions. These limitations may cause the DEIS striped bass model to estimate extremely high and counter-intuitive levels of density dependent mortality. For example, typical DEIS results indicate that it would require a mere 100 of the 10 year-old striped bass females to produce over 90% of the recruitment produced by the full stock at its carrying capacity in the absence of fishing and entrainment/impingement mortality. We believe the qualitative effect of the types of errors we discuss in our full report…support an alternative hypothesis of much lower density-dependence (and higher sensitivity to entrainment and impingement) than the results presented in the DEIS for the striped bass population. <fn32>

The indiscriminate use of density dependent models of fishery population has substantially allowed power generators to eviscerate statutory requirements to minimize adverse environmental impact. Even where applicants fail to support or inappropriately apply these models, simply understanding their

implication requires an extraordinary level of bio-statistical sophistication beyond the range of most reviewing agencies and members of the public which typically do not have the resources necessary for effective critical review. Industry's use of such models will typically undergo less scrutiny than in the historic conflict over the Hudson River power plants, and thereby avoid critical questioning even though they may be no more appropriate. As a result, ubiquitous assertions of density-dependence, whether overt or implicit in stock-recruitment equations, have effectively allowed applicants to utilize individualized cooling water intake review to avoid the statute's minimization mandate.

Footnotes

27 J. Boreman, Surplus Production, Compensation, and Impact Assessments of Power Plants, 3 Envtl. Sci. and Policy S445, S446 (2000).

28 Id. at S447.

29 Id. at S446.

30 See, e.g., New York State regulations for burden of proof in environmental adjudicatory hearings at 6 N.Y.C.R.R. § 624.9(b)(1).

31 See Draft Environmental Impact Statement for State Pollutant Discharge Elimination System Permit Renewal for Bowline Point 1 & 2, Indian Point 2 & 3 and Roseton 1 & 2 Steam Generating Stations Appendix VI-4.

32 ESSA Technologies Ltd., Review of the Draft Environmental Impact Statement for SPDES Permits for Bowline Point 1 & 2, Indian Point 2 & 3, and Roseton 1 & 2 Steam Electric Generating Stations, October 20, 2000, at v.

EPA Response

Please see response to comment 316bNFR.529.006.

EPA also agrees that there is evidence that some of the modeling efforts conducted by industry may be of doubtful value (see Brunswick Nuclear Steam Electric Generating Plant discussion in response to comment 316bNFR.704.001).

Comment ID 316bNFR.802.010

Subject Matter Code	9.43
1977 Draft Guidance Definition of AEI	

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USEPA Interpretation of AEI.

In 1977, the USEPA issued a guidance document for state regulators and EPA regional offices charged with implementing section 316(b). <fn33> The 1977 EPA Guidance defined AEI as follows:

Adverse aquatic environmental impacts occur whenever there will be entrainment or impingement damage as a result of the operation of a specific cooling water intake structure. The critical question is the magnitude of any adverse impact. <fn34>

This definition properly acknowledges that harm to aquatic life through impingement and entrainment including "damage" to fish, short of death, is AEI. The Guidance also recognized the difficulty in assessing the impacts of impingement and entrainment on all species in an ecosystem:

Adverse environmental impact may be felt by many species in all trophic levels. A species need not be directly affected but nevertheless harmed due to loss of food organisms or other associated organisms in some way necessary for the well-being and continued survival of the population. It is not practicable to study all species that may be directly or indirectly harmed by intake structure operations. <fn35>

Footnotes

33 Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b), P.L. 92-500, U.S. Environmental Protection Agency, Office of Water Enforcement, Permits Division, Industrial Permits Branch, Washington, D.C., May 1, 1977.
34 Id. at pp. 11, 15 (the quoted text appears on both cited pages).
35 Id. at p. 15.

EPA Response

EPA agrees that aquatic organism damage is a type of AEI, and believes this is encompassed in EPA's interpretation of the phrase AEI. Under today's rule, AEI includes impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population’s potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (see preamble section VI.B.2.a.).

EPA also agrees that impingement and entrainment losses can cause indirect effects to other species. EPA believes that, especially for the new facility rule, measuring environmental performance in terms of reduction of impingement and entrainment is appropriate because measuring impingement and entrainment is quicker, less costly, and has a higher degree of certainty than conducting measurements

of various types of harm to aquatic organisms or indirect impacts caused by impingement and entrainment. Many scientists agree that studies using population endpoints cannot be conducted in a scientifically defensible fashion within a short period of time. In fact, it is often the case that 20 years or more of monitoring data are required to properly evaluate effects at the population level (see response to comment 316bNFR.507.004 and preamble section VI.B.2.c). Finally, EPA notes that minimization of entrainment and impingement also provides protection for all species at all trophic levels.

Since 1977, USEPA has reiterated that definition. In a recent paper entitled A draft regulatory framework for analyzing potential adverse environmental impact from cooling water intake structures, <fn36> USEPA officials who are currently preparing section 316(b) regulations referred to and quoted the 1977 Guidance definition of AEI. In the preamble to the proposed new facility regulation, EPA stated that it is considering several possible definitions of AEI, which can be summarized as follows:

1. AEI means the impingement or entrainment of one (1) percent or more of the aquatic organisms from the area around the cooling water intake structure;

2. AEI would be defined as impingement and entrainment and the key inquiry would be an assessment of the magnitude of such effects (same as the 1977 Guidance). EPA could clarify through guidance when the magnitude of environmental impact is great enough to be deemed adverse;

3. AEI would be deemed to occur whenever aquatic organisms are impinged or entrained as a result of the operation of a cooling water intake;

4. AEI would be defined in relation to reference sites for the type of ecosystem in which the facility proposes to locate the intake structure and then the projected impact of the intake structure on the abundance, diversity, and other important characteristics of the aquatic community that would be expected to inhabit the site would be evaluated; and

5. a definition of AEI that would focus on (1) the protection of threatened, endangered, or otherwise listed species; (2) protection of socially, recreationally, and commercially important species; and (3) protection of community integrity, including structure and function. <fn37>

Because the entrainment and impingement of aquatic life constitutes adverse environmental impact, but assessing the myriad effects dead fish on the ecosystem is a colossal task, EPA's third proposed definition is accurate and workable. Alternatively, the second definition, which follows the 1977 Guidance, would be appropriate so long as the threshold magnitude were set low enough to provide an exemption only in true de minimis circumstances.

Disturbingly, in its recent Notice of Data Availability, EPA indicated it is "considering whether to define adverse environmental impact using a population endpoint." <fn38> EPA also indicated that it is considering the following definition proposed by industry:

Adverse environment impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, and (2) is attributable to the operation of the cooling water intake structure. <fn39>

As explained above, the industry proposal and any definition of AEI which is made solely with

reference to population endpoints is inaccurate and unworkable. It would inappropriately create a regulatory threshold which allows for substantial diminution in fisheries abundance and creates risks for long-term sustainability, before a BTA determination would even be required.

Other federal agencies have maintained that any impingement or entrainment is AEI. The National Oceanic and Atmospheric Administration (NOAA), which includes the National Marine Fisheries Service (NMFS), has stated:

EPA's suggested third alternative, which describes [AEI] as impingement and entrainment, is the best alternative…. EPA should avoid defining [AEI] in an ecological context solely at the population or community level. [AEI] needs to account for forgone predation, the associated loss of secondary production, and localized impacts. Allowing a reduction in fisheries populations based on the idea that populations exhibit surplus production, and will compensate for losses, ignore the fact that surplus production exists to maintain population levels exposed to multiple stressors (e.g., climatic weather events, natural fish kills, and fishing mortality). <fn40>

Very few Section 316(b) BTA determinations have made it to federal court. One case that did, concerning the Seabrook Station in New Hampshire, is frequently cited by industry as having held that the killing of many individual fish is not AEI. <fn41> In fact, the court in that case only upheld EPA's conclusion that the protection and propagation of rainbow smelt and flounder would be assured. The definition of AEI, and whether the "protection and propagation" standard was the proper standard for EPA to have applied under Section 316(b), were not at issue in that case.

Footnotes

36 Deborah G. Nagle, James T. Morgan, Jr., Environmental Science and Policy 3 (2000) ix-xiv.
37 65 Fed. Reg. 49059, 49074-49075 (Aug. 10, 2000).
38 66 Fed. Reg. 28853, 28859 (May 25, 2001).
39 Id.
40 NOAA Comments on the Proposed Rule for Cooling Water Intake Structures for New Facilities, provided to USEPA on December 18, 2000, at p. 3. Similar comments were made by the New England Fishery Management Council (NEFMC), which is charged by Congress to make recommendations to federal agencies concerning any activity that may affect the fisheries for twenty-six fish and invertebrate species in Federal waters off the coast of New England and the Mid-Atlantic. See Letter from NEFMC Chairman Thomas Hill to USEPA, dated November 17, 2000, at p. 2.
41 Seacoast Anti-Pollution League v. Costle, 597 F.2d 306, 309-311 (1st Cir. 1979).

EPA Response

EPA agrees with the summary provided by the commenter. Under today's rule for new facilities, EPA does not support evaluating AEI at the population or community level. Please see response to comment 316bNFR.507.004 and section VI.B.2 of the preamble to today's rule.

Comment ID 316bNFR.802.012

Subject Matter Code	9.42
Considered Definitions of AEI (1,2,3,4)	

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State Implementation of the BTA for Minimizing AEI Requirement.

In most states, the federal Clean Water Act's NPDES program, including section 316(b), is implemented by state regulatory agencies pursuant to a delegation agreement with the USEPA. State agencies, therefore, typically determine best technology available for minimizing AEI and issue NPDES permits that incorporate those requirements. It is highly significant, then, that a majority of states commenting on the USEPA's proposed definitions of AEI recognize that any impingement and entrainment constitutes AEI. New York, New Jersey, Pennsylvania, Michigan, and Alaska, as well as the Atlantic State Marine Fisheries Commission, have each urged EPA to adopt the proposed third definition of AEI because in their experience it is accurate and workable.

The New York State Department of Environmental Conservation (NYSDEC), which has had extensive experience with large-scale impingement and entrainment on the Hudson River, properly recognizes that the killing of any fish or other aquatic biota negatively impacts the ecosystem, and that no more fish than necessary should be allocated to death by impingement and entrainment:

Our program considers the death of any fish at or through a cooling water intake to be an "adverse impact." In the past the Department has stated that it is not appropriate to allocate a component of the public fish and wildlife resource to electric energy generators or other cooling water intakes. This pragmatic approach to defining adverse impact avoids the alternative of trying to determine the incremental impact of each intake upon the populations of dozens of affected species. That is, it avoids potentially endless, expensive studies that usually yield ambiguous or debatable results. The results are often debatable because it is impossible to identify, measure, and attribute the impact of each the many variables affecting populations on each of the impacted species. <fn42>

Likewise, the State of New Jersey Department of Environmental Projection (NJDEP) asserted that:

this third alternative [definition of AEI as impingement and entrainment] is the only practical alternative and should be adopted… This is the same definition that the Department currently uses in applying Section 316(b) policies for existing facilities. The Department considers the death of any fish at or through a cooling water intake structure to be an "adverse impact" which must be minimized under Section 316(b). This position makes sense and simplifies an already complex analysis. State agencies and permitting authorities could engage in a debate for years as to the population measure of a given fish species, let alone many fish species. The results of biological population studies and modeling can be very subjective because it is difficult to identify, measure, and attribute the impact of each of the many variables … affecting populations of the impacted species. Rather than engage in this kind of biological debate, time and resources would be better spent focusing on the magnitude of the impingement and entrainment losses in relation to the costs and benefits of implementing various technologies to avoid or minimize the impact. This focus is appropriate for section 316(b) which the Department feels is a technology-driven provision. <fn43>

And the Michigan Department of Natural Resources (MDNR)

support[s] the third alternative, which is a similar approach taken by the State of New York that defines adverse environmental impact as any impingement or entrainment of aquatic organisms. ... The State of Michigan has experienced considerable inaction in the adoption of technology because of disagreement among power producers and agency biologists if operation of the facility is causing adverse impact. The adoption of the new language would make the definition of adverse impact very clear and ultimately better protect the aquatic resource. <fn44>

Footnotes

42 New York State Department of Environmental Conservation, Division of Fish, Wildlife, and Marine Resources, Clean Water Act section 316(b), Statement provided to U.S. Environmental Protection Agency, June 29, 1998: Public Meeting to Discuss Adverse Environmental Impacts resulting from Cooling Water Intake Structures, at p. 1. In addition, NYSDEC states that the goal of CWIS regulation should be zero mortality. This is consistent with minimizing AEI.

43 State of New Jersey, Department of Environmental Protection, letter from Dennis Hart, Assistant Commissioner, to USEPA dated November 9, 2000 at p. 4 [emphasis added].

44 MNDR letter to USEPA dated Nov 7, 2000 at p. 2. See also Commonwealth of Pennsylvania Department of Environmental Protection Comments on U.S. EPA's Proposed Regulations Addressing Cooling Water Intake Structures for New Facilities; August 10, 2000 (65 FR 49060) dated Nov 7, 2000 at p. 3-4 ("We would recommend that, at this time, EPA only reference in the regulation that adverse environmental impact is considered to be a level of impingement or entrainment of aquatic organisms that is recurring and/or non-trivial"); Alaska Department of Fish and Game November 1, 2000 letter to USEPA ("We support the proposed third alternative that defines [AEI] as ‘any impingement or entrainment of aquatic organisms'"); and Atlantic States Marine Fisheries Commission letter of November 8, 2000 to USEPA: "defining [AEI] as impingement and entrainment [] is the most appropriate [definition]."

EPA Response

Please see response to comment 316bNFR.029.013.

Comment ID 316bNFR.802.013

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Subject Matter Code 9.4

Adverse Environmental Impact

Industry's insistence on a separate definition of adverse environmental impact is a stratagem to create a significant procedural and technical roadblock to effective regulation of cooling water intake structures. Such a definition would set an inappropriate threshold before regulation could even take place, and would ironically complicate the task of determining best technology available to minimize AEI. It would also confer substantial advantages on industrial applicants due to their superior resources. EPA should define AEI as aquatic mortality due to impingement and entrainment, and then by regulation require the best technology available to minimize such impacts.

EPA Response

EPA agrees with the commenter. Under today's rulemaking for new facilities, EPA interprets adverse environmental impact to include impingement and entrainment; reductions of threatened, endangered, or other protected species; diminishment of a population's potential compensatory reserve; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function (please see preamble section VI.B.2.a. and response to comment 316bNFR.802.002.)