

Appendix G

Centrally Managed Point- of-Use Compliance Strategy: Analysis of Implementation Issues

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United States
Environmental
Protection Agency

Centrally Managed Point-of-Use Compliance Strategy: Analysis of Implementation Issues

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This document complements the *Guidance for Implementing a Point-of-Use or Point-of-Entry Treatment Strategy for Compliance with the Safe Drinking Water Act*, and will describe several of the key issues related to the implementation of a POU treatment strategy. Other useful resources include *Point-of-use/Point-of-entry for Drinking Water Treatment* and *Cost Evaluation for Small System Compliance Options: Point-of-Use and Point-of-Entry Treatment Units*.

This document is intended to aid you in complying with the provision allowing the use of point-of-use treatment devices for compliance under the Safe Drinking Water Act (SDWA), as amended in 1996. The SDWA provisions and other EPA regulations described in this document contain legally binding requirements. This document does not substitute for those provisions or regulations, nor is it a regulation itself. It does not impose legally binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based on the circumstances. EPA and State decision-makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions regarding a particular public water system will be made based on the applicable statutes and regulations. Therefore, interested parties are free to raise questions and objections about the appropriateness of the application of this document to a particular situation, and EPA will consider whether or not the recommendations or interpretations in this document are appropriate in that situation based on the law and regulations.

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Centrally Managed POU Compliance Strategy

Analysis of Implementation Issues

Section 1412(b)(4)(E)(ii) of the Safe Drinking Water Act (SDWA) identifies Point-of-use (POU) treatment devices as a potential compliance technology for small systems. In general, we believe that the highest level of protection is provided by central treatment, as it treats all water and removes any compliance burden from the homeowner and their children. However, some small systems may not be able to afford to install, operate, or maintain a central treatment facility. POU devices offer these systems with another means to achieve compliance with the Safe Drinking Water Act (SDWA) and protect public health in the short term. If the water system and state have developed a rigorous maintenance program, strong public education, and representative monitoring regime, POU devices can provide the public health benefits required by SDWA.

POU devices have demonstrated the ability to reliably remove a variety of other contaminants in lab studies and real-world applications in small communities (see Maintenance, below). Further, since, in general, only water dispensed at a single tap is treated, communities may realize substantial cost savings by using POU devices rather than installing or upgrading a central treatment facility.

While POU treatment offers a viable compliance option for many small systems for chronic contaminants, SDWA does not allow the use of POU units to treat for microbial contaminants [1412(b)(4)(E)(ii)]. We believe that these devices should therefore not be considered for the treatment of any contaminants which may cause acute health effects, or that pose a risk through non-ingestion routes of exposure (e.g., inhalation or direct contact), since not all water used by customers is treated to the same level. These devices should only be employed by systems that distribute water of known (good) microbiological quality.

Several issues were identified through discussions with system operators, State personnel, and vendors as vital to the successful implementation of a POU compliance strategy:

- Maintenance
- Monitoring
- Compliance
- Public outreach and participation

Maintenance

SDWA requires that all “Point-of-entry and point-of-use treatment units shall be owned, controlled and maintained by the public water system or by a person under contract with the public water system to ensure proper operation and maintenance and compliance with the maximum contaminant level or treatment technique....” Proper maintenance is essential to achieving and maintaining compliance with POU treatment. A review of the experiences of San Ysidro, New Mexico, where POU reverse osmosis (RO) units were installed to treat for arsenic, attests to this fact. Devices that received the recommended maintenance from appropriately trained personnel continued to operate well, while the performance of units that were not maintained according to this schedule deteriorated over time.¹ Several hundred POU RO units installed at a naval air station in Nevada have also demonstrated the ability to consistently

¹ Thomson, B.M. and M. O’Grady. *Evaluation of Point-of-Use Treatment Systems, San Ysidro, New Mexico – Final Report to U.S. Environmental Protection Agency*. University of New Mexico; Albuquerque, NM. February 1998.

reduce the concentrations of arsenic and provide high-quality finished water when maintained according to a rigorous replacement schedule.²

Frequency of Maintenance

Based on these findings, we strongly recommend that States require systems which implement POU treatment to establish and follow rigorous maintenance schedules. These schedules should be approved by the State primacy agency and should be based on State-supervised pilot testing of the treatment units using the communities' source water and rate of water use, and other factors such as manufacturer's recommendations or experience in similar situations. The frequency should also include a substantial margin of safety.³ In general, maintenance should be conducted at least every 6 months to ensure the continued effectiveness of the treatment units.

Components of Maintenance

Each maintenance visit should begin with a visual inspection of the treatment unit to identify leaks or any damage to the unit casing. Any scheduled compliance sampling should be done during the inspection, before membrane or filter replacement. Following this initial inspection, spent filters and membranes should be replaced (as mandated by the system's replacement schedule), the tap should be disinfected, joints should be inspected for leaks and all valves should be exercised. Proper unit operation should be confirmed following the completion of all maintenance activities with a rapid field test for the contaminant(s) of concern or an appropriate surrogate (e.g., measuring TDS reduction with a conductivity meter for RO systems). Simple and inexpensive field tests are available for many contaminants or their surrogates. For example, several firms offer field testing kits for arsenic, while most RO devices are equipped with built-in TDS monitors that may be activated by simply touching a button to verify membrane integrity. Note that field testing and/or TDS monitoring do not release a system from its duty to conduct compliance monitoring discussed in the Monitoring section, below.

Equipment Reliability and Failsafe Devices

The SDWA states that if the American National Standards Institute (ANSI) has issued product standards applicable to a particular type of POU device, individual units of that type must be independently certified in accordance with such standards.⁴ The units must also be equipped with mechanical warnings to ensure that customers are automatically notified of operational problems.⁵ Devices certified to the ANSI/NSF International standards⁶ must meet rigorous criteria to ensure consistency in manufacturing processes, the validity of stated contaminant removal claims, and the safety of the materials used in the devices. As a

² Personal communication with Mr. Mark Jones in the Environmental Office of Naval Air Station Fallon (May and June 2001). Mr. Jones has recently transferred from the Environmental Office and has been replaced by Mr. Tim Mazanek.

³ EPA recommends a safety factor of 100 percent (i.e., replacement of filters and membranes after they have been used for half of their demonstrated effective life).

⁴ ANSI has adopted the standards developed by NSF International for drinking water treatment units.

⁵ SDWA Section 1412(b)(4)(E)(ii).

⁶ A list of units certified to these standards is provided on NSF International's website: <http://www.nsf.org>.

result, certified products have a very high level of consistency and reliability under normal operating conditions. The mechanical warnings commonly incorporated into POU units—including warning lights, audible alarms, and automatic shut-off valves—provide an additional measure of safety to consumers in the event of a substantial change in source water quality or device failure. These safeguards enhance the already high reliability of POU treatment units and, when coupled with a rigorous maintenance strategy based on the results of pilot testing, should ensure ongoing protection of public health.

Qualifications of Maintenance Personnel

SDWA requires that the individuals responsible for maintaining POU units must work for the water system or work for a firm contracted by the water system to maintain the units.⁷ In either case, they should be qualified to perform the necessary maintenance. Some States may require training in POU unit maintenance as appropriate under their operator certification programs. Other States may choose to establish specific requirements for individuals who install, maintain, and monitor POU devices. Equipment vendors frequently offer maintenance services for the units they sell or rent. These and other equipment maintenance service providers may serve as valuable resources for systems that pursue POU compliance strategies. Professional associations for POU manufacturers, vendors, and service personnel offer a range of certification programs and can verify the qualifications of prospective maintenance personnel.⁸

Monitoring

Monitoring finished water is required to ensure ongoing compliance with the maximum contaminant levels (MCLs) established by the National Primary Drinking Water Regulations. The Arsenic Cost Working Group (ACWG), an independent body composed of representatives from EPA Headquarters, EPA Regional Offices, States, and industry, was asked by the National Drinking Water Advisory Council (NDWAC) to review the information and assumptions underlying the cost estimates for the Arsenic Rule. Based on professional experience, the conservative maintenance and replacement schedule proposed in the Technology and Cost Document for the Rule, and the SDWA certification requirement for POU devices used for compliance, ACWG concluded that monitoring at every unit was not necessary to protect public health as long as each household was visited at least once a year.⁹ The maintenance schedule we recommend above ensures that each household is visited at least twice per year for a thorough maintenance inspection. Any reduction in sampling locations is based on this rigorous maintenance schedule.

The objective of monitoring under the SDWA is to evaluate the characteristics of water distributed by a system that is representative of each source after treatment to ensure that it is safe for consumption. The drinking water regulations associated with arsenic and other inorganic contaminants regulated under the standardized monitoring framework require sampling points to be located at each entry point to the distribution system or at an alternative location if conditions make such a location more representative.¹⁰

⁷ SDWA Section 1412(b)(4)(E)(ii).

⁸ For example, the Water Quality Association (WQA) has established several certification programs for vendors and maintenance personnel. More details are provided on their website: <http://wqa.org>.

⁹ Arsenic Cost Working Group. *Report of the Arsenic Cost Working Group to the National Drinking Water Advisory Council*. August 14, 2001.

¹⁰ 40 CFR 141.23(a)

For centralized treatment, it is generally assumed that the quality of treated water is consistent. Therefore, a single sample taken at the treatment plant prior to distribution is representative of the quality of all treated water.

Based on a number of factors—including the high reliability of the POU units, thorough pilot testing for proper unit calibration and maintenance, the nature and configuration of a POU treatment strategy, and the aggressive maintenance schedule described above—we believe that a sample taken at one tap can be a representative sampling point for the water at all taps after POU treatment. This would be true where all households are equipped with the same POU device and treat water from the same source; all units are subject to the same ownership, maintenance, and operational control; and all units are subject to the same maintenance schedule.

We recognize that States may wish to enhance the monitoring strategies for systems using POU devices. We have identified two approaches that we believe meet the monitoring requirements in CFR 141.23, and will ensure the evaluation of representative compliance samples.

Option One: Compliance Sampling at a Representative Number of POUs

As discussed above, individual POU devices of the same make are expected to produce finished water of consistent quality when treating water from the same source. Using the flexibility in CFR 141.23(a), it is appropriate to modify the locations at which a system takes samples to ensure that the samples it takes are representative of the quality of water provided to customers after treatment. Compliance samples would be taken prior to the maintenance of the unit.

We believe that the State can require compliance monitoring at a percentage of homes annually that will be statistically representative of the full community. Through this representative sample, States can be confident that water quality at these homes will be consistent with the water quality throughout the community. We request your comment on the factors that should be considered in establishing a representative sample.

Option Two: Utilizing the State Waiver Program

CFR 141.23(c) allows nine-year IOC monitoring waivers to be granted by the State. Under this option, States would grant waivers to systems that use POU devices as long as the systems complied with all requirements established by the State (e.g., duration of pilot testing, frequency of maintenance, certification of maintenance personnel, etc.). These systems would then be required to sample each unit at least once every nine years, effectively ensuring that one-ninth of units would be sampled each year. Waivers would be granted on the basis of the high reliability of the units and the rigorous maintenance schedule employed by the system (described above).

As previously discussed, we believe that POU devices of the same make that treat water from the same source will produce finished water of the same quality. Since all units would be sampled at least once over the course of the nine-year waiver period, sampling would be conducted at each representative sampling point identified by the system at least once during the compliance period. As in the option above, compliance samples would be taken before maintenance of the unit.

In order to obtain a waiver, water systems must have 3 rounds of monitoring below the MCL. We believe that this requirement can be met by requiring that one third of the units be sampled each year for

three years. At the end of that period, systems may reduce the number of units sampled to one ninth every year.

A sub-option would be to allow water systems to move immediately to the nine-year monitoring cycle, without taking the 3 initial samples. Results of the pilot tests on three units would be used instead.

Additional Monitoring

Regardless of which option is selected, we recommend that systems verify the proper operation of each unit during each maintenance visit. Required compliance monitoring should be supplemented through the use of available field tests (see Maintenance, above), which would be used as a screen at every household. A field test that showed positive for any level of arsenic would trigger a compliance sample at that location. This practice will provide an additional layer of public health protection.

Compliance

Compliance determination for water systems using POU devices must consider all monitoring, reporting, and public notification requirements established by statute and regulation. Therefore, it is necessary to identify what constitutes a monitoring violation and what constitutes an MCL violation. Both monitoring options rely on frequent and effective maintenance to ensure public safety.

Maintenance and Monitoring Plans

Therefore, systems should develop written maintenance and monitoring plans. Compliance with such a plan should be confirmed through records such as log sheets and receipts for maintenance services provided by labs or contractors. It is recommended that the plan and all records are stored at the system and are available for inspection. For the recommended monitoring strategy, the failure to adhere to the rigorous maintenance program established by the system (in conjunction with the State and the equipment vendor) *or* the failure to sample the designated sampling points could be considered a monitoring violation. We believe some States will choose to make the failure to adhere to the maintenance program a treatment technique violation through regulation.

Compliance Determination

Regulations associated with arsenic and other inorganic contaminants require that compliance with the MCL be determined based on the analytical results obtained at each sampling point. If any sampling point is in violation of an MCL, the system is in violation. Systems will only be considered in violation of the MCL when the running annual average of the analytical results of the quarterly samples collected at a given sampling point exceeds the MCL. Quarterly samples at a sampling point are triggered when a contaminant concentration at a sampling point exceeds the MCL.¹¹ The higher level of monitoring required after the detection of a single sample above the MCL directly follows the requirements of the rule.

¹¹ 40 CFR 141.23(i)

Return to Compliance

If the MCL is violated, the system should take immediate steps to return to compliance (including, but not necessarily limited to, replacing filters, membranes, etc.) and conduct additional sampling to verify compliance. Returning to compliance after an MCL violation should involve the demonstration of an additional sample(s) below the MCL and adherence to the system's maintenance and monitoring plan.

Public Outreach and Participation

Community buy-in is another essential element of a successful POU compliance strategy. Before deciding to install POU treatment devices in private households, systems should inform their customers about the need for treatment, the pros and cons of potential alternatives, and the responsibilities of residents and of the water system under a POU treatment strategy. Because POU devices will generally be installed on only one tap, it is important to let the residents of the community know that they should be drinking from that one tap.

The system will need to maintain ongoing communication to reassure residents that the devices are functioning properly and to schedule necessary maintenance and monitoring. In addition to face-to-face contact and telephone calls, systems have relied on public meetings, brochures, public service announcements, and bill enclosures to convey necessary information to customers. We recommend that systems include a description of their POU treatment strategy in the Consumer Confidence Reports (CCRs) that they provide to their customers to further explain the purpose, function, and effectiveness of these devices.

The system must install a POU device in each customer's home in order to be in compliance with the Rule. A small number of customers may be reluctant to allow installation of or access to a household treatment unit. Ordinances and access agreements have been used by systems to help ensure that maintenance personnel can gain access to units located on private property in order to conduct the maintenance and monitoring necessary to ensure compliance. Under such an ordinance, those customers who refuse to allow unit installation may be cut off from service. Systems may work with local government officials to develop an ordinance appropriate for their community.