



# The OCRWM Enterprise

• DECEMBER 1997 •



THE OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT (OCRWM)

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## In This Issue...

- Viability Assessment To Provide Important Information About Geologic Disposal at Yucca Mountain ..... 1
- A Message from the Acting Director ..... 2
- Congress Appropriates \$30 Million Less Than OCRWM Requests—President Vetoes Additional \$4 Million ..... 2
- Researchers Study Effects of Heat on Rock and Water Movement ..... 3
- Working Group Meets To Discuss Radioactive Waste Transportation Issues ..... 4
- NWTRB Makes Recommendations and Restructures Its Technical Panels ..... 4
- OCRWM Issues Revised Notice for Implementing Section 180(c) of NWPA ..... 5
- The OCRWM Quality Assurance Program—Doing More with Less ..... 6
- OCRWM Welcomes New HBCU Undergraduate Scholars ..... 7
- The View from the Mountain: Top Project Managers Reflect Upon the Nation's Radioactive Waste Problems ..... 8
- Information Management Restructuring Improves OCRWM Performance ..... 11
- Computers Are OCRWM's Gift to Nevada Schools ..... 12
- New Information Resources ..... 16

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## Viability Assessment To Provide Important Information About Geologic Disposal at Yucca Mountain

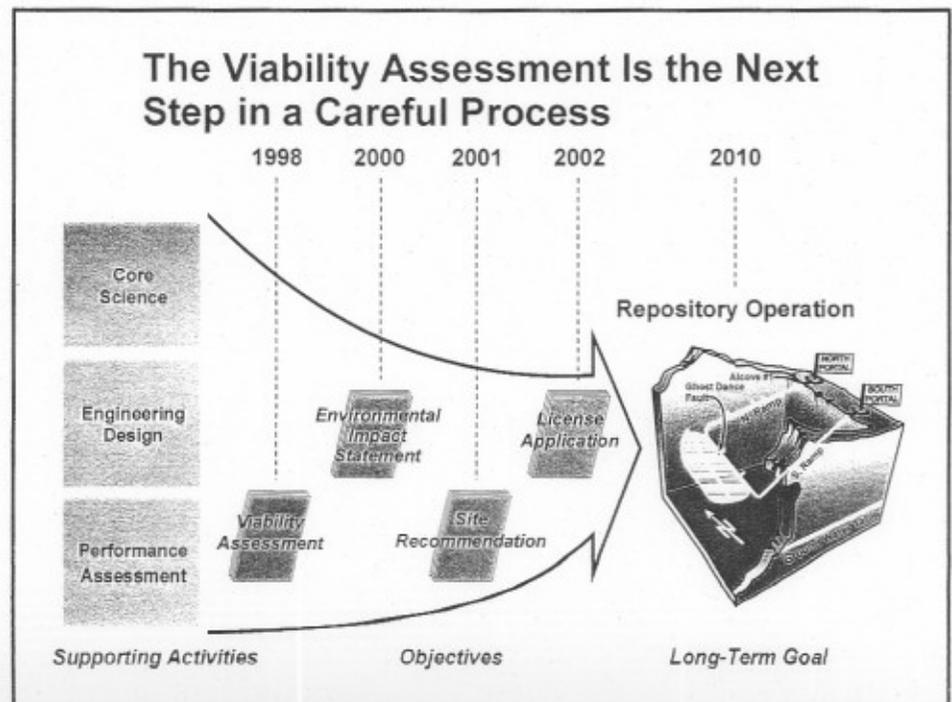
Over the past several years, the Yucca Mountain Project has focused on addressing major unresolved technical issues in the characterization of Yucca Mountain, Nevada, as a potential repository site for spent nuclear fuel and high-level radioactive waste. By September 1998, this focus on resolving technical issues will permit the Office of Civilian Radioactive Waste Management (OCRWM) to complete the four components of the viability assessment required by the FY 1997 Energy and Water Development Appropriations Act. While the viability assessment is not one of the decision points defined in the Nuclear Waste Policy Act of 1982, as amended, it will give policy makers important information regarding the prospects for geologic disposal at Yucca Mountain.

### An Important Management Tool

The viability assessment will also serve as an important management tool for the Program. The development of its components will help integrate the ongoing activities. The assembled information will guide the completion of site characterization by identifying those areas where additional scientific and technical work is required to evaluate the site and prepare a defensible, complete, cost-effective, and timely license application.

General agreement between the Program and its overseers and regulators on these remaining activities is central to the continuation of the geologic disposal program.

(continued on page 14)



## A Message from the Acting Director

Dear Reader:

As the national debate on the future direction of our Program continues in Congress, OCRWM is making steady progress toward completing the site viability assessment at Yucca Mountain, Nevada. Such an assessment is a significant benchmark for the site characterization program. It will provide a better understanding of geologic disposal at Yucca Mountain, the significance of the data available, and a guide for completion of the Program, including, if the site is found suitable, a site recommendation to the President in 2001, and submittal of a license application to the Nuclear Regulatory Commission in 2002.

The Program's Fiscal Year 1998 appropriation for the OCRWM Program is \$346 million—\$34 million less than OCRWM requested. More information on OCRWM's budget can be found in the "Congress Appropriates \$30 Million Less than OCRWM Requests—President Vetoes Additional \$4 Million" article found on this page.

Congress is still considering legislation to address the near-term management of spent nuclear fuel. The Senate has passed a bill, S. 104, similar to legislation it passed last year, that would site an interim storage facility at the Nevada Test Site by approximately June 30, 2003, with alternate siting provisions if the President, upon consideration of the results of the viability assessment, determines that the Yucca Mountain site is not viable for repository development. The House also passed a bill, H.R. 1270, that would direct the Department of Energy to begin waste acceptance at an interim storage facility

at the Nevada Test Site by January 31, 2002, irrespective of the outcome of the viability assessment. A conference committee representing both legislative bodies will meet to reconcile differences in the bills.

The Administration opposes both bills being considered, and the President has indicated that he would veto either bill if presented in its current form. The Administration opposes the proposed legislation because it would effectively designate a specific site for an interim storage facility before the viability of a permanent geologic repository at Yucca Mountain

(continued on page 13)

## Congress Appropriates \$30 Million Less than OCRWM Requests—President Vetoes Additional \$4 Million

On October 13, 1997, the Energy and Water Development Appropriations Bill was signed into law by the President. It provides \$350 million for OCRWM in Fiscal Year (FY) 1998. This funding level is \$30 million below the level requested for OCRWM in the President's FY 1998 budget request. Of the \$350 million in the bill, \$160 million is to be derived from the Nuclear Waste Fund, and the remaining \$190 million is to be derived from the Defense Nuclear Waste Disposal Appropriation.

The conference report that accompanies the FY 1998 Energy and Water Development Appropriations Bill also specifies that for scientific oversight activities, "affected units of local government," as defined by the Nuclear Waste Policy Act of 1982 (Public Law 97-425), shall receive no more than \$5 million, and the State of Nevada shall receive no funding. In addition, the bill specified that \$4 million from the Nuclear Waste Fund be provided to the Nuclear Regulatory

Commission (NRC) for multi-purpose canister (MPC) licensing.

The report directs OCRWM to distribute the reduction as follows: \$11.95 million from core science activities at Yucca Mountain and \$16 million from personnel costs, training and travel expenses for Federal employees, support-service contractors, non-safety training for contractor employees, cooperative agreements, and other programs not directly associated with the performance of characterization and interim storage activities. At the time of this writing, OCRWM is in the process of adjusting its FY 1998 workplans to absorb the specified reductions.

Subsequent to the enactment of this legislation, the President exercised his line-item veto authority and struck the \$4 million that was earmarked for the NRC to license an MPC design. The reduction lowers the amount of funding provided to OCRWM from \$350 million to \$346 million. ■

### December 1997

*The OCRWM Enterprise* (formerly the *OCRWM Bulletin/Of Mountains and Science*) is published twice a year by the U.S. Department of Energy's Office of Civilian Radioactive Waste Management (OCRWM) to inform the public about OCRWM activities. To be placed on the mailing list for this newsletter, make address corrections, obtain information about the OCRWM Program, or order copies of *The OCRWM Enterprise* or the new publications listed in this issue, please contact the:

**OCRWM National Information Center**  
600 Maryland Avenue, SW, Suite 695  
Washington, D.C. 20024  
1-800-225-6972  
(202-488-6720 in Washington, D.C.)

You are also invited to use the many features of the OCRWM Home Page at:

<http://www.rw.doe.gov>

## Researchers Study Effects of Heat on Rock and Water Movement

As part of ongoing site characterization activities at Yucca Mountain, Project scientists are testing the effects of heat generation on the rock and water movement through the mountain. The heater testing began in the laboratory and has progressed to extensive testing in the field.

The field tests include the large-block heater test, single-heater test, and the drift-scale test. Electric heaters are used in these tests to represent the heating effect of the future waste materials in the repository. The field tests simulate thermal conditions that would occur if spent nuclear fuel and high-level waste were stored at Yucca Mountain. The single-heater and drift-scale tests take place in Alcove 5 of the Exploratory Studies Facility; the large-block test takes place in the Fran Ridge area of Yucca Mountain. Strategy for the heat testing is to go from small scale tests to larger tests, from simpler to more complex tests, from tests of short duration to tests of many years' duration.

Scientists are studying four physical processes through the heater tests: thermal, mechanical, hydrologic, and chemical. During the thermal and mechanical tests, scientists will study

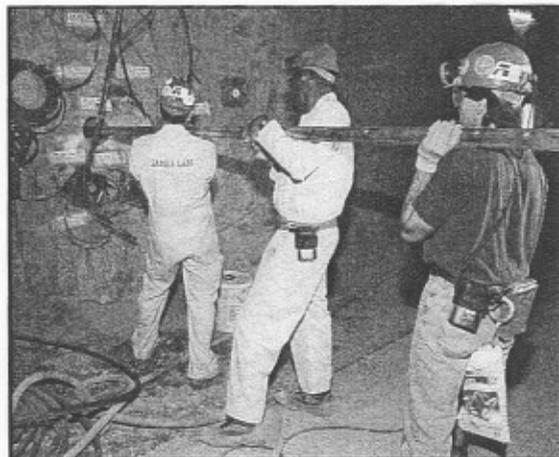
the effect of heat on the rock and examine changes in rock stress and stability as a result of heating and cooling. Hydrologic tests study the movement of water in the rock as it heats up. Chemical tests look at changes in the chemical composition of the rock and the chemical changes to moisture in the rock as the heat moves it from the rock pores. These processes are interrelated, and scientists are studying the relationships among these processes.

### Large-Block Heater Test

The large-block heater test is being conducted in the Fran Ridge area of Yucca Mountain. A 3-meter (10-foot) by 3-meter (10-foot) by 4.5-meter (15-foot) piece of rock was carved from the mountain to create a test block. The test block is the same geologic formation as the potential repository. Investigators will examine the effects of heat on the large block of rock. The heaters will be turned off and the block monitored by scientists for a 5-month cool-down period.

### Single-Heater Test

The single-heater test is taking place in Alcove 5 in the Exploratory Studies Facility, approximately 300 meters (984 feet) below the surface of the mountain. This test started in August 1996 and completed its heating phase in May 1997. It is now going through a 9-month cool-down phase. This test will



*Project workers place heater element in rock. During the single-heater tests scientists placed more than 300 thermometers in rock throughout the testing alcove to determine the effects of heat on the rock and the movement of water.*

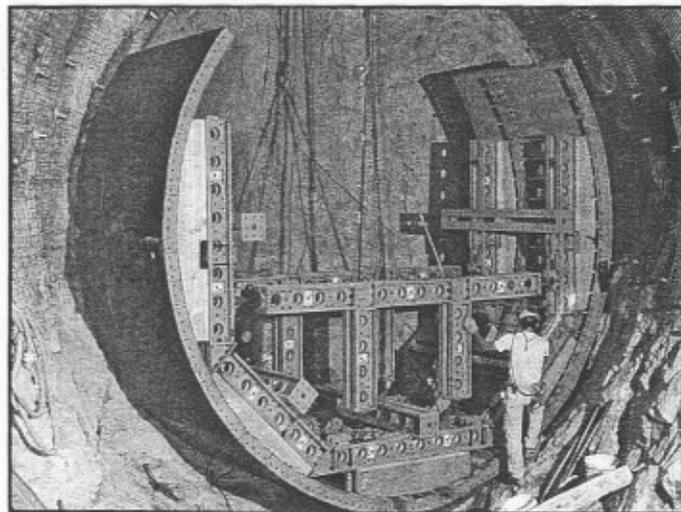
assist in predicting and observing the behavior of rock and moisture as they are heated and cooled in a simulated repository environment.

### Drift-Scale Test

Data collected from the laboratory tests, large-block heater test, and single-heater tests helped scientists prepare for the much larger drift-scale test.

The drift-scale test is the largest of the heater tests. In this test, which began in December 1997, the heaters will continuously heat an alcove approximately 48 meters (156 feet) in length in the Exploratory Studies Facility for 4 years. Scientists will heat this alcove with electric heaters. The heaters will be placed in simulated waste containers on the floor and directly in boreholes drilled in the walls of the drift.

The drift test will be evaluated during testing, and heating will be adjusted to ensure test objectives are met. The drift will be observed during the cool-down phase which is expected to last 4 years. The cool-down phase also may be adjusted to meet cool-down testing objectives. ■



*The drift-scale test will take place in the Thermal Test Facility, currently under construction within the Exploratory Studies Facility.*

## Working Group Meets To Discuss Radioactive Waste Transportation Issues

The Transportation External Coordination Working Group (TEC) held its twelfth semi-annual meeting July 15-17, 1997, in Albuquerque, New Mexico. More than 150 participants met to address a variety of issues related to the Department of Energy's (DOE) transportation activities for radioactive materials.

TEC is the primary external coordination mechanism established by DOE to help provide continuing and improved coordination between OCRWM and other DOE elements, other government organizations, and outside entities with responsibility for or interest in DOE transportation activities. TEC's members include personnel from various DOE programs, including OCRWM and the Office of Environmental Management (EM); national and regional organizations representing State, Tribal, and local governments; professional associations; and industry organizations.

Discussions focused on the "Accelerating Cleanup: Focus on 2006" draft document; Spent Fuel, Waste Isolation Pilot Plant (WIPP), OCRWM and Tritium Program updates; OCRWM activities; the EM

National Transportation Program; the U.S. Department of Transportation's pending transportation legislation; and a panel discussion on rail inspection and rail emergency preparedness programs.

The four topic groups that were formed following the January 1997 TEC meeting (in response to requests from TEC members to address issues in smaller groups) reported their progress to the full TEC membership. The funding and technical assistance topic group closed out the discussion on the appropriate equipment for inspecting and responding to a radioactive materials transportation accident. The group will now focus on the mechanics of technical assistance and funding.

The rail issues topic group is focusing on the development of two matrices. The first will address rail laws and regulations and their applicability to States, Tribes, and carriers. It will also address jurisdictions' rights to inspect rail shipments. The second matrix will compare the Commercial Vehicle Safety Alliance's enhanced truck inspection standards to current rail inspection standards. Both matri-

ces will be distributed to the full TEC membership and discussed at the January 1998 TEC meeting.

The routing topic group reported that it was drafting a white paper to address a comprehensive DOE routing policy. The group will recommend that DOE commit to a uniform methodology on routing.

The emergency response training topic group distributed a job-task analysis matrix to the TEC membership. The TEC members were asked to provide comments on the matrix to DOE's Office of Environmental Management by October 1, 1997.

The next TEC meeting is scheduled for January 20-22, 1998, in Las Vegas, Nevada. July 1997 meeting notes and further information about the January 1998 meeting will be posted on the TEC web site at <http://www.uetc.org/tec>.

To obtain a copy of the TEC summary, contact the OCRWM National Information Center at 1-800-225-6972 (202-488-6720 in the Washington, D.C., area). The summary is also available on the TEC web site (address listed above). ■

## NWTRB Makes Recommendations and Restructures Its Technical Panels

In March 1997, the Nuclear Waste Technical Review Board (the Board) released its 1996 *Report to the U.S. Congress and the Secretary of Energy* on its findings and recommendations for the OCRWM Program. Consistent with previous reports, the Department responded to the nine recommendations contained in this report in October 1997. The Board recommended that a decision on an interim storage facility be deferred until the Program determines the suitability of the Yucca Mountain site (scheduled for 2001), that to the extent possible under the market-

driven initiative, dual-purpose canisters should retain the advantages of the multi-purpose canister, and positions on the following technical issues:

- **Design Alternatives**—The Board recommended that more design alternatives be evaluated for both the repository and waste package. Alternatives mentioned specifically include reduced reliance on remote handling in the repository, ventilation of emplacement tunnels, shielding for waste packages, concrete tunnel liners, fillers, backfill materials, drip shields, engineered inverts, and other design alternatives that may result in sig-

nificant savings during the operational phase. OCRWM assured the Board that many design alternatives are still under active consideration. A reference design has been developed for use in the viability assessment; however, as scientific work progresses at a rapid pace over the next several years, we expect the design to evolve to reflect our increased understanding of the repository environment.

- **Additional Site Characterization**—The Board feels that additional studies of the area west of (continued on page 14)

## OCRWM Issues Revised Notice for Implementing Section 180(c) of the Nuclear Waste Policy Act

After reviewing comments received on its Notice of Proposed Policy and Procedures (*Federal Register*, Vol. 61, No. 96, September 30, 1996) for implementing Section 180(c) of the Nuclear Waste Policy Act of 1982 (NWPA), as amended, and conducting further research, OCRWM decided to make significant changes to the proposed policy. As a result of this decision, OCRWM published the Section 180(c) Notice of Revised Proposed Policy and Procedures in the *Federal Register* (Vol. 62, No. 137) on July 17, 1997.

Section 180(c) of the NWPA requires the Department of Energy (DOE) to provide funding and technical assistance to train local public safety officials of States and Tribes through whose jurisdictions DOE plans to transport spent nuclear fuel and high-level radioactive waste. Such training would cover safe routine transportation procedures as well as emergency response procedures.

The most significant change in the July 17, 1997, Notice is a new process for allocating the Section 180(c) funds. Instead of following a strict formula, the policy describes the level of training that would be allowed with Section 180(c) grant funds. The applicants would describe in their application packages the amount of training needed for their jurisdictions to prepare for the shipments. The technical and financial assistance will cover only the increment of training needed to assist inspectors and emergency responders who handle radioactive materials shipments. As in the prior proposed notice, the grant recipient would determine who receives the training, and who provides the training. OCRWM would consider funding the cost of higher levels of train-

ing if sufficient funds are available and if the grant recipients can demonstrate that the higher-level training is consistent with their current emergency preparedness training program.

Grant recipients would be able to use up to 25 percent of their grant funds to purchase equipment for inspections and emergency response situations 2 years prior to transportation through their jurisdiction. Once transportation commences, only 10 percent of the annual grant would be allowed for equipment purchases. The eligibility requirement has been expanded to allow States and Tribes eligibility in those cases in which a route constitutes the border between two jurisdictions. States and Tribes having cross-deputization or mutual aid

agreements with a jurisdiction that has shipments, even though no shipments may occur within the borders of the responding State or Tribe, may receive funding from the jurisdiction that will receive shipments.

The Revised Proposed Policy and Procedures can be viewed on OCRWM's Home Page at <http://www.rw.doe.gov>. To request a paper copy of the Revised Proposed Policy and Procedures or a Section 180(c) information packet, please contact the OCRWM National Information Center at 1-800-225-6972 (202-488-6720 in the Washington, D.C., area). Written requests may be sent to the OCRWM National Information Center at 600 Maryland Avenue, SW, Suite 695, Washington, D.C. 20024. ■

### OCRWM Holds Transportation Workshops for the Public

The Office of Civilian Radioactive Waste Management held two public workshops in August 1997 to discuss issues related to the transportation of spent nuclear fuel and high-level radioactive waste under the Nuclear Waste Policy Act of 1982, as amended. The workshops, held in Dallas, Texas, on August 7-8, and in Reston, Virginia, on August 12-13, assembled more than 100 people with varying views on transportation activities. Participants included representatives from industry, State and Tribal governments, environmental organizations, and the general public.

The workshops provided a forum for open discussions where participants expressed their views and had an opportunity to listen to the

contrasting views and concerns of others. On the first day of each workshop, participants had an opportunity to provide public comments and submit items for public record. During the second day of each workshop, summary reports from the breakout sessions, public comments, and items submitted for the record were recorded.

Recorded transcripts from the public comment sessions, attendance lists, and items submitted for the record are available on the OCRWM Home Page at <http://www.rw.doe.gov> or by contacting the OCRWM National Information Center at 1-800-225-6972 (202-488-6720 in the Washington, D.C., area). ■

## The OCRWM Quality Assurance Program - Doing More with Less

With the advent of the OCRWM Quality Assurance (QA) Program, the Department of Energy (DOE) has entered into an unfamiliar environment; that is, an environment regulated by the United States Nuclear Regulatory Commission (NRC). The Quality Assurance Requirements Description (QARD) was developed to meet the requirements of the NRC in a manner similar to the QA program descriptions of commercial nuclear facilities.

Since OCRWM is regulated by the NRC, receipt of our repository operating license will be dependent on our having fulfilled the regulations set forth by the NRC and having provided the regulator sufficient objective evidence to support our scientific and engineering efforts.

The NRC developed a Standard Review Plan for a geologic repository similar to the Standard Review Plan developed for the commercial nuclear industry. The Standard Review Plan is used as a guide by the NRC to evaluate whether the OCRWM QA Program meets NRC requirements for a geologic repository.

### The Evolution of the QA Program

Traditionally, the commercial nuclear industry has fulfilled NRC QA program requirements by having each subcontractor develop its own QA program document, which typically led to redundant activities and extensive infrastructure.

The OCRWM QA Program was developed in a manner similar to that of the commercial nuclear industry. Affected organizations (i.e., program participants such as the Management and Operating contractor, national labs, etc.) performing quality affecting work were required to develop their own QA program documents and associated implementing procedures.

In December 1992, OCRWM issued the QARD document. This document superseded the QA program documents of all affected organizations and set the stage for consolidating, under the Office of Quality Assurance, the program-wide QA function; that is, those QA and Quality Control activities described in the QARD for the OCRWM Program.

### Contributing Factors

Consideration of several earlier concerns, recommendations, and commitments from both within and outside DOE relative to OCRWM's complex organizational structure and current budgetary constraints were contributing factors in the quest for "One QA Program" for OCRWM. The following concerns, recommendations, and commitments were typical:

- Reporting on a December 1993 review of OCRWM, the *Edison Electric Institute* advised that "DOE should continue to look for ways to consolidate existing organizations."
- A June 1994 report by the U.S. Department of Energy Inspector General recommended, for cost savings, "Where practical, consolidate present multiple subcontracts at different locations for such common functions as quality assurance and records management into single contracts."
- The Secretary of Energy, in a Fiscal Year 1996 Performance Agreement with the President of the United States, committed to downsizing, elimination of nonessential activities, and the reduction of management layers in order to "create a government that works better and costs less."

### Reengineering the QA Function

The consolidation of the QA function occurred in the following two phases:

#### Phase I

In 1994, the Office of Quality Assurance performed a study to determine ways that the OCRWM QA Program could be improved. This study concluded the following:

- Multi-layered audit activities were often redundant with little added value
- Because of the diverse backgrounds of individuals and organizations, audits were not being performed in a consistent manner
- Office of Quality Assurance audits had been acknowledged by the NRC as being performed to adequate depth in a consistent and professional manner
- Considerable cost savings were possible if redundant audits were eliminated and administrative functions, such as maintenance of auditor qualifications/certifications, were centralized.

In addition to the savings that could be realized through the consolidation of audit activities, the study recommended that the mandated annual QA Management Assessment, performed by each of the affected organizations, be consolidated into a single QA Management Assessment by the Director of OCRWM for additional cost savings.

Based on the conclusions of the study, the Office of Quality Assurance assumed responsibility for OCRWM audit activity and the Director of OCRWM assumed responsibility for the QA Management Assessment in July 1995.

#### Phase II

In 1996, based on the success of the consolidation of audit activities in Phase I, the Office of Quality Assurance performed a follow-up study to determine additional ways that the OCRWM QA Program could be improved. The study concluded that consolidation of all QA functions un-

(continued on page 13)

## OCRWM Welcomes New HBCU Undergraduate Scholars

Six juniors and seniors from the Nation's Historically Black Colleges and Universities (HBCUs) attended a special orientation workshop conducted by OCRWM in Las Vegas, Nevada, July 27-29, 1997. The students had been selected to receive scholarships through OCRWM's HBCU Undergraduate Scholarship Program based on their outstanding academic performance and their desire to pursue careers in high-level radioactive waste management. The scholarships began on September 1, 1997.

An icebreaker was held the night the scholars arrived to allow program sponsors and incoming students the opportunity to become acquainted and to share necessary information on the administrative aspects of the Scholarship Program. The following morning, the incoming students heard presentations by current HBCU scholars on their summer internships with TRW Environmental Safety Systems in Las Vegas, and at the Yucca Mountain Field Operations Center, where they worked on projects that included evaluation of waste package materials, characterization of water flow at the soil-atmosphere interface, and the collection of solar radiation, neutron borehole, and C-well data. Scott Hanson, the luncheon speaker, answered questions about TRW's efforts to place scholars in positions directly related to their fields of study to ensure that the summer internships offer students meaningful opportunities to increase their knowledge and skills and to see how they could contribute to the achievement of OCRWM's mission. The afternoon was spent at the Yucca Mountain Science Center, where staff of the Yucca Mountain Site Characterization Office presented an overview of current activities at Yucca Mountain and the scholars were free to examine the Center's many exhibits addressing the climate, geology, hydrology, and wildlife of Yucca Mountain.

Early the next morning, the students returned to the Science Center for a special safety training session required of all visitors planning to travel inside the mountain. Dr. John Hartley, a geologist working on the Yucca Mountain Project, served as volunteer tour guide, providing a commentary on the unique geologic features of the Nevada landscape through which they passed during the 2-hour trip to Yucca Mountain.

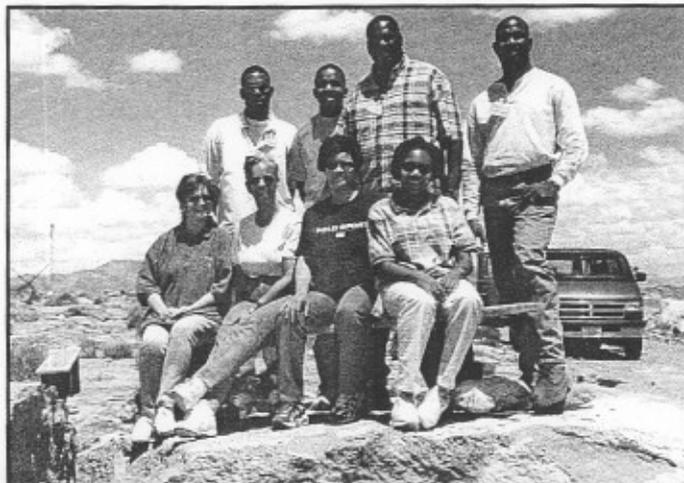
The first stop was at the crest of Yucca Mountain, which offers a 360° view of the potential setting for the Nation's first geologic repository, a view that has changed very little for hundreds of thousands of years. Dr. Hartley pointed out the extinct volcanoes marking Crater Flats and described the origin of the mountain ranges visible in all directions from their vantage point.

From the top of the mountain, the group continued to the point of entry into the mountain, the north portal. Here, the students picked up required hard hats and other safety equipment and were joined by Doc McNeely, who accompanied them on their train ride into the Yucca Mountain Exploratory Studies Facility (ESF). The students were able to witness several of the many ongoing *in situ* tests being performed in alcoves off the main tunnel. Doc McNeely explained the complex instrumentation and the importance of the scientific studies in determining if the Yucca Mountain site is suitable for construction of a geologic repository for spent nuclear fuel and high-level radioactive waste. He answered all of the students' questions about the moisture migration studies; thermal monitoring tests; seismometer data collection;

single-point convergence pins mounted in the tunnel walls and ceiling to measure any rock expansion that may result from excavation; and the Bow Ridge Fault, a significant geologic feature of the underground facility.

Before returning to Las Vegas, the students stopped at the south portal to view the enormous, custom-constructed Tunnel Boring Machine (TBM) that excavated the ESF to provide scientists and engineers with access to the host rock in which a repository ultimately may be built. Since completing the 5-mile main loop of the tunnel in April 1997, the TBM has rested on pads outside the portal.

The students returned home the following morning with a knowledge of the importance of OCRWM's mission and an understanding and appreciation of the exciting and challenging work being performed by scientists and engineers at Yucca Mountain. The interest and enthusiasm of the students caused everyone with whom they came in contact to see the Program anew, through their eyes, and take fresh pride in OCRWM's accomplishments and in their day-to-day work. All agreed that OCRWM has every reason to be proud of its new scholars and its HBCU Program that encourages tomorrow's scientists, engineers, and decision makers to devote their careers to high-level radioactive waste management. ■



HBCU Scholars and Program staff at the crest of Yucca Mountain

## The View from the Mountain: Top Project Managers Reflect Upon the Nation's Radioactive Waste Problems

The English poet William Blake once observed that "Great things are done when men and mountains meet." Blake eventually gained acclaim as a visionary with a keen appreciation of the importance of scientific progress. Today, his words apply to the Yucca Mountain Project. Great things were done this year. At Yucca Mountain, men, women, and mountain met and considerable progress was made in the effort to determine whether Yucca Mountain is the right place to build the world's first permanent repository for spent nuclear fuel and high-level radioactive waste.

Indeed, considerable headway has been made. Now, Project researchers are gearing themselves toward completing a viability assessment that will tell Congress next year whether any results to date indicate that a repository could not be built at Yucca Mountain, and if it were built, how it would perform, how much it would cost, and how long it would take.

With this in mind, we asked some of the Yucca Mountain Project's top managers to step back, if only for a moment, and recall the site character-

ization effort when they first joined it. What was the Project's focus then, and how has it evolved? What has it been like to work on so monumental, not to mention so controversial, an undertaking? How does one deal with the uncertainties inherent in the thousand-year time periods under consideration? And what have they learned that might benefit the country when it next undertakes a project of this magnitude?

This is what we heard:

### J. Russell Dyer

*Dr. J. Russell (Russ) Dyer is the Acting Project Manager of the Yucca Mountain Project, and shares responsibility for the conduct of all work on the Project. Before joining the Project 8 years ago, he was a faculty member in the Geology Department at the University of Texas, El Paso, where he taught and conducted research in structural geology, tectonics, and physical processes. He brings to the Project more than 20 years' experience in earth science investigations of the desert Southwest.*

"Because this is such a controversial and public endeavor, you've got to be very careful in what you do. Everything has to be completely aboveboard. There's a lot of baggage associated with the context this endeavor takes place in, notably a large Federal project.

"As a former Yucca Mountain Project manager once said, 'Perception is reality.' Federal governmental undertakings are not viewed with a great deal of favor or trust by the public. I've found that you've got to go out of your way to try and overcome that.

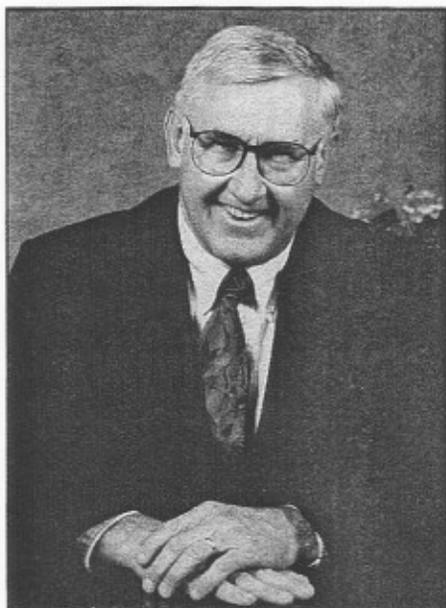
"Regaining the public's trust works on several levels. In the professional or technical arena, we have to make a concerted effort to be very

clear, precise, and as accurate as possible in the things we say. We also have to understand that sometimes that is not what people want to hear. They want to have a definitive answer right now. Yet there are many things here we don't have a definitive answer to right now. A wise man knows what he doesn't know. That's really at the heart of what the technical side of credibility is—being honest about what you know and what you don't know.

"So much of credibility and trust, however, is built on personal relationships. I'm not sure about average individuals' feelings about science. But if they have a relationship with a scientist, their feeling about science in general may be predicated on their feelings for that individual. So, we encourage our people to be active in the community, to be good citizens.

"I don't think that, initially, we could have taken a fundamentally different approach to the Project than the one we did. If you want to understand something, whether it's a mountain or a building, there are an infinite number of things you can study. When we started out, it wasn't really clear what the important things were. We had some ideas, some hypotheses, but we couldn't afford to just follow only those. We had to look at alternatives. Ultimately, we were able to look at a relatively small amount of data and say no, this is a blind alley, let's refocus ourselves and concentrate on other things. After we had accumulated 5 or 10 years of information, it was really possible to say, 'Okay, we're down to two or three important things—let's concentrate on them.'

"There will always be uncertainty on this project. We will never know all of the answers. It's not possible to know everything. That would take some kind of divine revelation. But



J. Russell Dyer

there is a point where you have a comfortable level of uncertainty. I don't know everything there is to know about Yucca Mountain, but I do know enough to feel comfortable about going ahead.

"We're very close to making that kind of recommendation. If you talk to the technical community, there are some who are more comfortable than others. Getting additional data will make more of the technical community even more comfortable. It's like an insurance policy. We could go forward based on a little more than we have now, or we could gather a lot more information than we have. I think there's a middle ground that might provide a prudent course.

"The formal determination on whether Yucca Mountain is suitable and can be used to build a repository is some time away. The mass of evidence we are accumulating today says yes, it probably will be found suitable. We haven't found any show-stoppers yet. It looks like we could make a reasonable case for reasonable people that this is a site and a system that will protect public health and safety and the environment.

"This is not just another big science project. Most big science projects in the past were straightforward technological slam dunks. Now, scientific endeavors must be completed through a joint effort in the technical, political, and public arenas. All of those forces have to be in agreement for a project such as this to maintain the momentum. Some of the big water control—dam—projects of the '40s and '50s were done pretty much in isolation—out of sight, out of mind. You can't do that in this country any more.

"I consider myself an environmental activist. There's a problem with safe, long-term disposal of radioactive waste, and I'm doing something to fix it. Part of the impetus for a repository -- for a sense of urgency

that existed 15 years ago -- was a moral and ethical commitment by our leaders to take responsibility for dealing with this. They did not want to foist this problem on our children. That sense of urgency has fallen away, in part, because of the end of the Cold War. There's a change in the whole mind set of our country. However, the underlying premise that it is our job to clean up after ourselves remains, and I don't think we can walk away from it."

### Susan Jones

*Engineering geologist Susan Bahnick Jones is the associate to the Project Manager for the Yucca Mountain Site Characterization Office. As such, she provides managerial and technical analysis and recommendations spanning the range of technical disciplines employed in site characterization. Jones joined the Project as a subcontractor in 1984. In addition to her work for OCRWM, she has held the positions of Special Project Manager and Staff Geologist for Science Applications International Corporation.*

"I joined the Department of Energy (DOE) in 1989 because I felt I could make more of an impact on the ultimate direction of the Program using that geology background and other project control skills I had developed as a contractor. I came to the Project Control Branch to deal with scheduling, budgeting, and scope-definition issues. Later, I became Regulatory Interactions branch chief—in heading toward a license application, we needed to learn about the Nuclear Regulatory Commission's (NRC) expectations. I interacted with the NRC for 2 years before becoming the Project's assistant manager of scientific programs.

"A lot of what we do here is geologic and hydrologic work—basic applied science. There are areas—geochemistry and unsaturated zone hydrology—where we are pushing



Susan Jones

the edge in research. Other basic data gathering is fairly straightforward. Geologic mapping is geologic mapping. You map in the same way to identify faults whether you're planning to build a nuclear powerplant or a high rise.

"What's different here are the long time frames involved in building a repository. We're not looking at the standard 40- or 100-year operating life of an average facility. We're trying to project scientific phenomena for tens of thousands, hundreds of thousands, and even millions of years.

"Geologists tend to be people who can deal with the kind of uncertainties associated with such long time frames. Or, maybe, having studied geology you become comfortable with long time frames and uncertainty. I'm not sure which is the cause and which is the effect. Whether it's temperament or training that gets you to that point, though, it's not necessarily something that engineers are comfortable with...or even the general population. It's so far outside of human experience that you can only make your best guess. And you base that guess upon your documentation of what's happened in the geologic past.

(continued on page 10)

## The View from the Mountain (continued from page 9)

"One cornerstone for us is that the present is the key to the past. The processes operating now, we believe, operated in the past and will operate in the future. You have to make this leap of faith. And no, not everyone is comfortable with that. Mother Nature may decide to fool us. We can make a prediction, but we may have to wait 10,000 years to see if that prediction comes true. We don't have an instant feedback loop to tell us whether our estimates are right or wrong. If we start emplacing waste, we'll have decades that the repository is kept open to validate those predictions. Even so, you're talking about using tens of years to predict what may happen over hundreds or thousands of years.

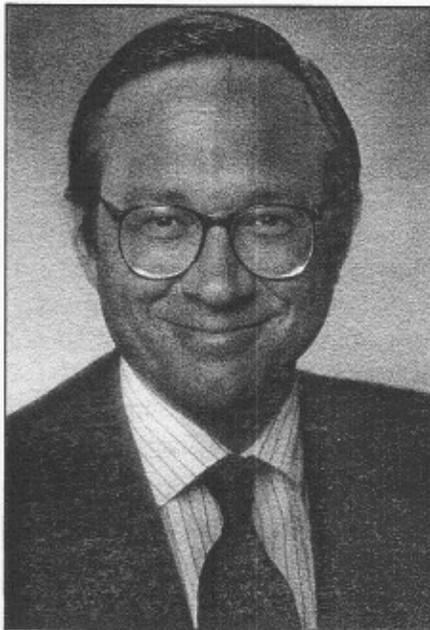
"Did we try to do too much at first? Back in the mid-1980s, the idea was to lay on the table all the possible questions and all the techniques that could be used to answer them. At first it seemed many things might require investigation. For example, when you stand on top of Yucca Mountain, you're standing on top of a pile of volcanic rocks. You can look out to Crater Flat and see several small cinder cones. But how important is that type of volcanism to the repository? It took several years of work to validate our initial position—that volcanism is a waning phenomenon that is not likely to have an impact on a repository.

"We always have a set of questions in front of us that we are trying to answer. The questions change as we learn more, but we have to know what the questions are and have a strategy for answering them. Now, every proposal that comes in for new work, and every new piece of data that comes in as the result of that work, is evaluated against that strategy and those questions. We then add programs and collect more data or eliminate programs and reduce data-collection accordingly.

"It took us a lot of time to get to this point. We've been operating this way since 1994. So my advice to the manager of the next major scientific effort like the Yucca Mountain Project is to always allow your modeling and analysis efforts to keep up with the data-collection activities. Since 1994, we have been converting our data into a coherent and timely picture of how the site is working. As a result, our scientific program has achieved a clear focus on those processes most important to the safety of a geologic repository."

### Richard Craun

*As Assistant Manager for Viability Assessment and Special Projects, Richard Craun is shepherding the Project's Viability Assessment to ensure it gets to Congress in a timely fashion. A graduate of Colorado State University, where he studied mechanical engineering, Mr. Craun came to the Project 3 years ago to work on the tunnel excavation program. He joined DOE 6 years ago, after 15 years as a site engineering manager with the Public Service Company of Colorado.*



Richard Craun

"I came to the Project primarily to help with the excavation of the Exploratory Studies Facility (ESF). We were at the initial stages of getting the Tunnel Boring Machine into a production mode. Since then, we've made some tremendous improvements during the construction of the ESF.

"At first, the Tunnel Boring Machine was behind schedule. I don't think we had done any excavation at all. Within the first couple of months we were falling further behind. We ran out of materials and shut the machine down once or twice. Within about 6 months, maybe 7, we made the necessary process and procedural changes to start resolving some of these issues. We were thus able to avoid any shutdown due to material shortages. We were actually able to get ahead of the machine's needs, and could then look at ways to improve the machine's productivity. Within about 9 months, we caught up, returned to schedule, and surpassed it.

"The purpose of the ESF was to build an underground lab so we could continue with the science. It also gave us a very good firsthand feel for the construction issues we need to address in the repository design. There are approximately 128 kilometers (80 miles) of emplacement drift to be built. If we can get a 15- or 20-percent improvement in production rate, that's a significant dollar savings to the utility ratepayer and taxpayer. Anything we can do to improve the excavation process will significantly reduce the repository's life-cycle costs.

"The ESF was the first major underground construction in which the Project was able to define and meet a schedule. That was important to us. It set the stage for us to say that we have the ability to produce on sched-

ule and within budget, whether it be an ESF or a viability assessment. If we cannot meet our schedules, it's difficult to stand up in public and say that we can accurately predict costs and control those costs to meet our projections.

"I hope the Nation decides to build a repository, if for no other reason than to consolidate the waste in a more benign location. It's a policy issue. Does the United States want to go forward with a program to develop geologic disposal? We are focusing on putting together a viability statement that will clearly state what a design for a repository could be, how it would perform, and at what cost. Hopefully that information will help the policy makers make that decision."

### Allen Benson

*As Director of the Office of Institutional Affairs, Allen Benson manages institutional, intergovernmental, and public affairs activities for the Yucca Mountain Project. During 20 years with DOE, Mr. Benson has served in a variety of capacities, most recently as team leader for Institutional Programs in the Environmental and Operational Activities Division, and from 1992-1994, as Division Director of the Program Relations Division. He holds a master's degree in public administration from American University and an undergraduate degree in history.*

"In the course of this work, I meet many people who are opposed to, or critical of, what we're doing, and I tell them, 'Please, by all means, hold our feet to the fire. Don't take our word for anything. Make us demonstrate that whatever we propose is ultimately safe.'

"There are those who really and truly believe this attempt to dispose spent fuel and high-level waste is wrong. Their views are valid. We

(continued on page 15)

## Information Management Restructuring Improves OCRWM Performance

Over the past 3 years, OCRWM has established a corporate framework for information management (IM), composed of an IM Steering Committee, IM Council, and IM user group. The purpose of this organizational structure is to assist in defining and clarifying IM authorities and responsibilities, and promoting consensus and program integration. One of the first initiatives emerging from the IM Council was the development of Program-wide strategic and multi-year plans, and the issuance of annual IM planning guidance. In addition, OCRWM has established an IM performance assessment and improvement program. The tangible results, to date, of these initiatives have been several process improvements that save time, reduce costs, and enhance productivity—among them paperless correspondence control, controlled milestone tracking, an automated forms system, a streamlined records management process that uses imaging technology to reduce entry and retrieval times, and a state-of-the-art electronic Home Page.

The strategic application of information technology contributes to the accomplishment of OCRWM's mission by providing computer systems, solutions, and services that enhance the productivity of OCRWM's

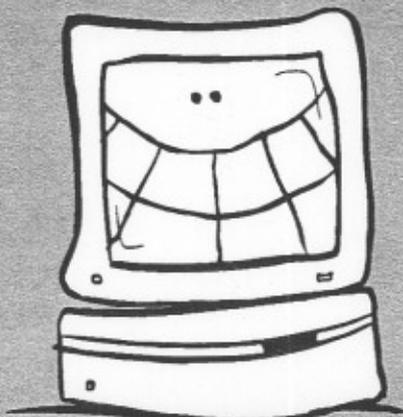
employees, drive business process improvement efforts, reduce overall Program costs, and support reinventing government initiatives of the National Performance Review (a comprehensive approach to helping the government work better and cost less). OCRWM's IM organization:

- Streamlines Program work processes through automation to increase the productivity and job satisfaction of OCRWM's employees.
- Designs and develops computer systems to support the OCRWM mission.
- Provides a reliable electronic mail (e-mail) network for effective and timely access to, and communication of, information.
- Ensures integration and integrity of technical, regulatory, management, and financial information.

OCRWM's IM organization at Headquarters and Yucca Mountain serves the Program by:

- Maintaining over 654,000 records
- Processing over 7,800 records per month
- Responding to over 3,100 help desk inquiries per month
- Maintaining an e-mail system that processes over 298,000 messages per month
- Training approximately 60 users per month in various systems and applications
- Managing over 130 hours of videoconferencing per month
- Tracking over 70 pieces of correspondence per month
- Maintaining over 2,000 personal computer work stations.

Ninety-four percent (94%) of IM customers are highly satisfied with IM services; computer network prime-time availability is consistently 98%. ■



## Computers Are OCRWM's Gift to Nevada Schools

The problem with personal computers is that today's speedboat invariably becomes next year's boat anchor. But the bane of the technical community, which depends upon ever-greater computing power, can be a bounty for educators. The break-neck pace of computer development means that perfectly functional systems capable of supporting word processing, Internet access, and the CD-ROM programs and archives most useful to students and teachers may often be bought for a song.

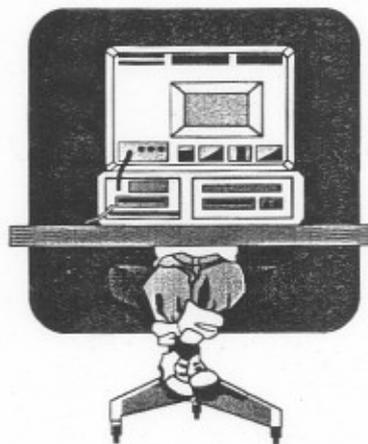
Since last summer, though, OCRWM's Yucca Mountain Site Characterization Office (YMSCO) took this concept to another level by making gifts of hundreds of excess IBM-compatible systems to schools within the Clark, Lincoln, Nye, Mineral, Esmeralda, Eureka, Lander, White Pine, Inyo (California), and Churchill County School Districts. Originally used within the Site Char-

acterization program at Yucca Mountain, Nevada, these computers will now support math and science education in the schools. More than 800 computer systems have been given to schools to date.

These computer systems were provided within the context of the Department of Energy's Math and Science Gift Program. This program is directed at helping schools and students reach national educational goals related to academic achievements in mathematics, science, and engineering. These goals include increasing the number of students pursuing careers in scientific and technical fields.

OCRWM and its contractors have been involved in ongoing efforts to help create and support educational opportunities nationwide, and in Nevada in particular. All gifts of computer systems were made through various memoranda of understanding with the respective school districts.

"The Department of Energy supports national education goals, and is keenly aware of the impact computer technology has on schools," said Allen Benson, Director of YMSCO's Office of Institutional Affairs. "By gifting these systems to school districts in Nevada and California, we are supporting math and science education and helping children to go out and be successful in the world." ■

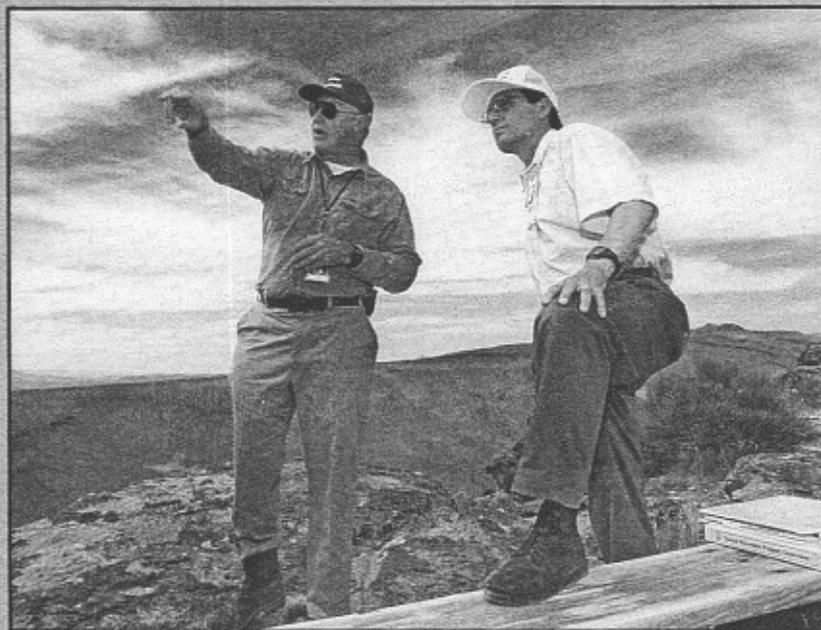


## Secretary Peña Visits Yucca Mountain

At the top of Yucca Mountain, Russ Dyer (left), Yucca Mountain Acting Project Manager, explains the geologic features of the surrounding area to Secretary of Energy Federico Peña. On August 18, the Secretary toured the mountain and the Exploratory Studies Facility (a 5-mile long laboratory excavated 800 feet below the surface). The Office of Civilian Radioactive Waste Management is studying Yucca Mountain as a potential repository for spent nuclear fuel and high-level radioactive waste. According to Secretary Peña, OCRWM's work here "will support the [Clinton] Administration's commitment to resolve the complex and important issue of nuclear waste disposal in a timely and sensible manner." During his visit to Yucca

Mountain and the Nevada Test Site, the Secretary also stressed that "the Department of Energy wants to assure that any course of action pur-

sued [at Yucca Mountain] is consistent with sound science and protects public health and safety and the environment." ■



## Quality Assurance (continued from page 6)

der the Office of Quality Assurance would be appropriate and cost-effective. The most significant potential benefits leading to this decision were:

- Enhanced licensee involvement
- Reduced QA Program infrastructure
- Reduced QA Program cost
- Enhanced QA independence
- Consistent implementation through uniform interpretation of QA Program requirements.

Based on the conclusions of the study, the Office of Quality Assurance assumed full responsibility for the OCRWM QA function in October 1997.

## Breaking an Industry Precedent

OCRWM broke an industry precedent by developing a single QA Program document—the OCRWM QARD. This document is sufficiently flexible to allow the development of implementing procedures that will meet each affected organization's needs and still comply with regulatory requirements. OCRWM has continued to break industry precedents through the consolidation of audit activities and, most recently, through the consolidation of the QA function under the Office of Quality Assurance. These consolidation activities have resulted in a reduction of approximately 40 percent to the OCRWM

QA budget as well as improved implementation of the QA function.

The actions taken to date do not mark the end of OCRWM's striving for excellence, but are milestones along the way to successfully meeting its vision of leading the Nation to the achievement of environmentally sound disposal of spent nuclear fuel and high-level radioactive waste for the good of this and future generations.

Plans are already under way to consolidate the implementing procedures of the various affected organizations into a single set of OCRWM implementing procedures that will be used by all affected organizations participating in the OCRWM Program. ■

## Message (continued from page 2)

has been assessed. It believes that such legislation could undermine public confidence that a repository evaluation will be objective and technically sound. The legislation, if enacted, would also result in spent nuclear fuel being transported twice, once for interim storage and again for disposal should Yucca Mountain prove unsuitable. The House bill also includes unrealistic deadlines for licensing, construction, and operation of an interim storage facility.

As reported in my last message to you (*The OCRWM Enterprise*, May 1997), Secretary Peña and I met with representatives of contract holders, environmental organizations, and State public utility commissions to discuss ways of mitigating the impacts of a delay in initiating waste acceptance beyond January 31, 1998.

OCRWM is proceeding with a dual-track approach to address the anticipated delay. First, we have begun a dialogue with contract holders to determine what actions, under the Standard Contract, would be appropriate to address the anticipated delay. Second, OCRWM is continuing discussions with representatives of the utilities, States, and other stakeholders to seek mutually agreeable solutions to mitigate impacts associated with the delay.

On January 31, 1997, a court petition was filed by nuclear utilities to require the Department to begin waste acceptance by January 31, 1998. Subsequently, on November 14, 1997, the U.S. Court of Appeals for the District of Columbia ordered the Department to proceed with contrac-

tual remedies to address its waste acceptance obligation.

As decisions on the OCRWM Program are being made, we will continue to keep our focus on implementing our revised Program Plan. Within the next year we will complete the Yucca Mountain site viability assessment, which will serve as a significant benchmark for the Program. For more information on this activity, please see the article, "Viability Assessment To Provide Important Information About Geologic Disposal at Yucca Mountain," on the cover of this newsletter.

*Lake H. Barrett, Acting Director  
Office of Civilian Radioactive  
Waste Management*

## Viability Assessment (continued from page 1)

### Assessment Has Four Components

To make an informed assessment of the viability of licensing and constructing a repository at Yucca Mountain, OCRWM proposed, and Congress affirmed, four components of the viability assessment:

1. A design for the critical elements of a repository and waste package
2. An evaluation of the predicted performance of the repository system, the way in which natural and manmade systems work together to contain waste and to protect people and the environment
3. A schedule and cost estimate for remaining work required to complete a license application
4. A cost estimate for construction and operation of a repository.

### Design Component Describes Repository Operations and Safeguards

The preliminary design concept for the repository and waste package includes a general repository description and concept of operation and waste-retrieval operations, as well as repository design requirements. It also must include information for:

- Surface and subsurface
- Waste package manufacturing and performance
- Engineered features that have a significant impact on the repository performance
- Performance confirmation concepts

- Operations support and safeguards.

Finally, the design concept will include a description of the state of resolution of key design issues.

### Assessment of How the Total System Performs

The second component, a Total System Performance Assessment, includes an analysis of the repository system's natural barriers, engineered barriers, variations in designs to enhance performance, and the interactions among each of them. It also analyzes how the systems will function during operation and over thousands of years. Sensitivity analyses will be performed to refine our strategy for the evaluation of the repository performance. We will also identify

(continued on page 15)

## NWTRB (continued from page 4)

the current Exploratory Studies Facility should be completed prior to any determination of the suitability of the site for a mined geologic disposal system. In particular, it would like to see construction of an east-west tunnel. In response to the Board's recommendation, OCRWM has approved a set of activities aimed at providing enhanced characterization of the repository block. These activities include an east-west drift in the repository block, two deep boreholes, and other related studies. Construction of the east-west drift should be completed in 1998.

- **Total System Performance Analysis (TSPA)**—The Board encouraged OCRWM to ensure that its TSPA was technically sound, defensible, and easily communicable to the public. The Board also recommended continued use of peer review in the development of the TSPA. With regard to the TSPA, OCRWM acknowledges that publishing highly technical information in a form readily digestible by the general

public will be a challenge. However, OCRWM views good public communication as essential to the Program's success and is actively developing enhanced public outreach strategies. OCRWM has experienced success with peer review and expert elicitation and will continue to use both in the production of the TSPAs.

### Recent Board Meetings

During the last four months, the Board held two Full Board meetings to discuss issues related to the OCRWM Program. Full Board meetings give the public an opportunity to observe the Board, OCRWM staff, and other scientists in an exchange of information on technical issues. At the June 25-26, 1997, meeting in Las Vegas, Nevada, Lake H. Barrett, Acting Director, OCRWM, presented an overview of the viability assessment, highlighting its significance to the Program. The agenda also included presentations by staff and contractors of the Yucca Mountain

Site Characterization Office regarding the viability assessment product descriptions and status, repository and waste package design, unsaturated and saturated zone flow and transport, updates of scientific activities, and the plans for an east-west drift crossing the repository block. Several Board members commented on the need for the Program to retain flexibility in the repository design to accommodate the new information resulting from the viability assessment.

On October 22-23, the Board held a 1½-day Full Board meeting in Fairfax, Virginia. Agenda topics for the Full Board meeting included an update of the OCRWM Program and impact of the Fiscal Year 1998 appropriation, an update of the Yucca Mountain Project, and updates of waste package design and repository design and operations. The day prior to the meeting, the Board's Environment, Regulations, and Quality Assur-

(continued on page 16)

## Viability Assessment (continued from page 14)

tify areas where significant uncertainties exist and, where possible, the means to reduce these uncertainties. Finally, the performance assessment will include calculations of potential radiation exposure to populations living in the vicinity of the repository.

### The Plan for a License Application

The third component is the license application plan, which will define the actions required, the scientific and engineering information that may be needed to complete a license application for submittal to the Nuclear Regulatory Commission, and the cost of the remaining work. The preparation of the license application plan will

also provide an opportunity to assess the adequacy of the revised approach to site characterization and design.

### Life-Cycle Cost

The fourth component is the cost estimate for the repository system, which will cover activities through repository closure. The life-cycle cost estimate will provide information for policy decisions regarding the feasibility of continuing with licensing and construction of a geologic repository.

The completion of these components constitutes a logical convergence point at which the Program can make a measurably improved appraisal of the prospect for geologic disposal at the Yucca Mountain site.

## The Viability Assessment Is Not the Formal Site Recommendation

The viability assessment is not the formal site recommendation required by the Nuclear Waste Policy Act, nor is it a final agency decision. It is, however, the next step in a careful process designed to solve a national environmental problem—disposing of spent nuclear fuel and high-level radioactive waste. A significant benchmark for the Site Characterization Program, the viability assessment will provide a better understanding of the likelihood of success for geologic disposal at Yucca Mountain, the significance of the data available, and a guide for the Program's next steps. ■

## The View from the Mountain (continued from page 11)

need to be concerned about that. We must be sensitive to their needs and concerns. We have to think before we speak. We need to make sure we know what we're talking about. We need to get our facts straight. We need to be prepared. But I think the controversial or sensitive nature of this project works to our benefit. It makes us do our jobs more conscientiously.

It may even make us better people in the process.

"Sure, the unflagging opposition can sometimes be disheartening. But not always. Recently, I addressed one of the affected counties. They wanted straight answers about our work, no beating around the bush. That's what they got. Later, they apologized for being too hard on me. I said, 'No, you're not being hard. You're asking fair, straightforward questions. And you're entitled to straightforward answers.'

"People should be asking hard questions. We have never been above criticism. For instance, we began by looking at too many things. We were just going on and on. Our search for information was endless, and toward what end, no one really knew. We didn't need to compile an encyclopedia on Yucca Mountain. To some extent, the scientists needed to be reined in a little. If you tell someone to study, to go forth and do good, that's what he or she will do. Everyone was well-meaning. They all tried to do the best job they could. But a

little bit of why we're here was lost. Now we're focused, and we're getting down to the basic issues.

"From my perspective, the narrowing has focused us on what we need to learn so that if we're asked a question we can give a simple answer. The issue of 'How safe a repository can we build here?' will be modeled. We're determining that. I am convinced the narrowing of focus is positive. It forces us to know more about the key issues than a lot about many different things. We needed to know more to ask the right questions. Sometimes you need to know a lot just to know what questions to ask. I think we've arrived at that point.

"There are lots of reasons why people oppose this project. Some of it has to do with a sincere belief that this could spoil the land. Others believe that if we close the fuel cycle, nuclear power will become palatable again. People have their reasons, and I try to understand where they are coming from. But this is a national problem, and we're trying to do something about it." ■



Allen Benson

**NWTRB (continued from page 14)**

ance Panel met. Topics of discussion included performance standards for a Yucca Mountain repository and modeling the biosphere near Yucca Mountain.

**Board Reorganization**

In April 1997, the Board reorganized its technical panels to be more closely aligned with OCRWM's activities. The original seven panels that the Board used to focus on specific parts of OCRWM's Program have been restructured into five panels that more closely reflect the current direction and content of OCRWM's efforts to deal with the Nation's commercial spent nuclear fuel and certain defense high-level radioactive waste.

- **The Panel on Site Characterization**, chaired by Dr. Debra Knopman, will review all onsite and laboratory studies of the natural characteristics of the Yucca Mountain candidate repository site. Dr. Victor Palciauskas will

provide the lead for technical staff assistance.

- **The Panel on the Repository**, chaired by Dr. Priscilla Nelson, will review repository design activities and plans for repository construction and operation. Mr. Russell McFarland will provide the lead for technical staff assistance.
- **The Panel on the Waste Management System**, chaired by Mr. John Arendt, will review the major components of the waste management system, except the repository, with a focus on the transportation infrastructure needed to move spent nuclear fuel. Dr. Sherwood Chu will provide the lead for technical staff assistance.
- **The Panel on Performance Assessment**, chaired by Dr. Daniel Bullen, will review system performance analyses with emphasis on methodologies (model abstractions, elicitations of expert judgment, and treatment of uncertain-

ties) that underlie the components of a total system performance assessment. Dr. Leon Reiter will provide the lead for technical staff assistance.

- **The Panel on the Environment, Regulations, and Quality Assurance**, chaired by Dr. Jeffrey Wong, will review environmental monitoring activities at Yucca Mountain and the preparation of an environmental impact statement for the site. Dr. Daniel Fehringer will provide the lead for technical staff assistance.

*To receive a copy of the Board's annual report, please contact Frank Randall, Public Affairs Specialist, Nuclear Waste Technical Review Board, at 2300 Clarendon Boulevard, Suite 1300, Arlington, Virginia 22201, or call 703-232-4473. Additional information on the Board can be obtained by accessing the Board's new web site at <http://www.nwtrb.gov>. Its new site can also be reached through a link on the OCRWM Home Page at <http://www.rw.doe.gov>. ■*

**New Information Resources**

To order the new publications or videotape listed below, free of charge, contact the OCRWM National Information Center at 1-800-225-6972 (202-488-6720 in the Washington, D.C., area). In writing, send requests through our web site at <http://www.rw.doe.gov> or to the following address:

**OCRWM National Information Center**  
 600 Maryland Avenue, SW  
 Suite 695  
 Washington, D.C. 20024

**Office of Civilian Radioactive Waste Management: Fiscal Year 1996 Annual Report to Congress, U.S. Department of Energy, DOE/RW-0494, May 1997**

This annual report contains details of OCRWM's activities and expenditures during Fiscal Year 1996 (October 1, 1995, through September 30, 1996), including audited financial statements.

**Summary of Public Scoping Comments Related to the Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, U.S. Department of Energy, May 1997**

This 100-page report summarizes the comments received from the public on a proposed repository at Yucca Mountain, Nevada.

**Yucca Mountain Project Tunnel Boring Machine: Daylighting videotape (Playing Time: 9-plus minutes)**

This short videotape highlights the completion of the Exploratory Studies Facility, a significant achievement for the OCRWM Program. The videotape focuses on the Tunnel Boring Machine and its specifically-designed components used to excavate the 5-mile tunnel, making Yucca Mountain accessible for scientific studies. It also features the seven alcoves that were excavated and are being used as underground laboratories.

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