



POLICY ISSUE (Information)

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SECY-91-222

For: The Commissioners

From: James M. Taylor
Executive Director
for Operations

Subject: QUARTERLY PROGRESS REPORT ON THE PRE-LICENSING PHASE OF
THE U.S. DEPARTMENT OF ENERGY'S CIVILIAN HIGH-LEVEL
RADIOACTIVE WASTE MANAGEMENT PROGRAM

Purpose: To provide the Commission with a Quarterly Progress Report
(April 1991 through June 1991) on the pre-licensing phase of
the U.S. Department of Energy's (DOE's) civilian high-level
radioactive waste (HLW) management program.

Background: In the Quarterly Progress Reports on the pre-licensing
phase of DOE's program, the U.S. Nuclear Regulatory
Commission (NRC) staff discusses the key aspects of the
NRC/DOE pre-licensing consultation program that deserve
Commission attention. The previous Quarterly Progress
Report, SECY-91-125, discussed activities that occurred
from January 1991 through March 1991.

Executive Summary: The most significant activities during this period were
in two areas of the repository pre-licensing consultation
program: Early Implementation of a Quality Assurance
Program (QA); and Early Resolution of Issues.

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Early Implementation of a QA Program

On May 13, 1991, the staff requested that DOE support an independent audit of the U.S. Geological Survey (USGS) by the NRC staff. This would be the first staff audit of a program participant since 1987. DOE agreed to support this audit in September 1991.

Early Resolution of Issues

During this reporting period, the staff issued two public comment draft Staff Technical Positions (STPs): (1) "Investigations to Identify Fault Displacement and Seismic Hazards at a Geologic Repository"; and (2) "Geologic Repository Operations Area Underground Facility Design -- Thermal Loads." The staff also issued the final STP on "Regulatory Considerations in the Design and Construction of the Exploratory Shaft Facility (ESF)."

Discussion:

1. DOE Implementation of Scheduled and Systematic Consultations

During this reporting period, neither of the two technical exchanges slated for this quarter was held as scheduled. These exchanges were to have covered NRC's STP on repository-design thermal loads, and a discussion of lessons learned from the Waste Isolation Pilot Plant (WIPP) experience, led by DOE's Office of Civilian Radioactive Waste Management (OCRWM) and DOE's Office of Environmental Restoration and Waste Management. As a result of work on the STP, the staff and DOE agreed that the technical exchange was not needed. With respect to the WIPP technical exchange, DOE informed the staff that it needed additional time to prepare. Therefore, as listed below, this technical exchange has been rescheduled to August 1991.

Staff from the Office of Nuclear Material Safety and Safeguards (NMSS) and the Office of Nuclear Regulatory Research (RES) jointly participated in two meetings of the Nuclear Waste Technical Review Board (NWTRB), and in an INTRAVAL performance assessment modeling workshop. These meetings and workshop are described below under Research activities.

On May 30, 1991, the staff met with DOE to schedule interactions between July and November 1991, and to identify potential interactions beyond November 1991. At the meeting, seven interactions were scheduled, covering: (1) data management; (2) glass waste form; (3) WIPP experience in performance assessment; (4) revisions to the procedural agreements between NRC and DOE; (5) Exploratory Studies Facility (formerly called the Exploratory Shaft Facility) design status; (6) scenario development and construction of a complementary cumulative distribution function; and (7) regulatory strategy, especially with reference to issue resolution.

During this reporting period, there were no interactions between DOE and the U.S. Environmental Protection Agency (EPA) on issues concerning high-level radioactive mixed waste and the Resource Conservation and Recovery Act.

2. Early Implementation of a QA Program

During this reporting period, the staff observed DOE QA audits of the USGS, Lawrence Livermore National Laboratory (LLNL), Science Applications International Corporation (SAIC), and the West Valley Demonstration Project. It also observed surveillances of LLNL, Sandia National Laboratories (SNL), the Yucca Mountain Site Characterization Project Office (YMPO), SAIC, USGS, and Raytheon Services Nuclear (RSN). No findings were identified during these audits or surveillances that would preclude DOE from starting site characterization activities.

The NRC staff began observing DOE QA audits in February 1988. This process of observing DOE audits enabled the NRC staff to evaluate both the DOE audit process and the organization being audited, while conserving NRC staff resources. Based on the improvements in both the DOE audit process and the QA program implementation of the audited organizations, the NRC staff considers the observation process to be effective in identifying and correcting QA program deficiencies. The NRC staff is now planning an independent, confirmatory NRC QA audit.

By letter dated May 13, 1991, the NRC staff requested that DOE support an independent audit of the USGS by the NRC staff. This audit would be the first staff audit of a program participant since 1987. The areas to be audited would include collecting hydrologic data at two or more wells on the Nevada Test Site, and tracing the data back through the USGS field office. DOE agreed to support this

audit in September 1991. The staff has begun the necessary preparations and plans to conduct a scoping visit in August 1991.

In the last Quarterly Progress Report, the staff reported that DOE had resolved the Privacy Act problem regarding the QA auditor access to personnel qualification records for all of the Yucca Mountain Project participants except the USGS. Resolution of the USGS Privacy Act problem was discussed at the June 25, 1991, NRC/DOE QA meeting, and the NRC staff now considers this issue closed.

Overall, DOE has continued to make considerable progress in resolving the staff's QA objection in the Site Characterization Analysis (SCA) of DOE's Site Characterization Plan for the Yucca Mountain site. However, the objection in the SCA cannot be completely removed until NRC accepts all QA programs, without exceptions.

At present, the LLNL, SNL, and Los Alamos National Laboratory QA programs have been accepted without any exceptions. The QA programs of Fenix and Scisson of Nevada (FSN), Holmes and Narver (H&N), Reynolds Electrical and Engineering Company (REECO), the USGS, and OCRWM, which includes both OCRWM Headquarters and the YMPO, have been accepted subject to various exceptions. DOE has been working to resolve these exceptions and the NRC staff is currently reviewing DOE requests for complete acceptance of the USGS and REECO QA programs. Although the exceptions in these five programs have not yet been removed, they are not related to the portions of the QA programs that have been identified by DOE as needed to start site characterization work.

RSN is in the process of assuming the HLW repository contractual responsibilities of FSN and H&N; the RSN QA program is based on the FSN and H&N QA programs, and is being implemented at this time. It has not yet been submitted to the NRC staff for acceptance. The QA program of SAIC/Technical and Management Support Services (T&MSS) has been accepted by DOE and submitted to the NRC staff for acceptance. This request is under review by the NRC staff. SAIC/T&MSS QA program acceptance is not needed to start site characterization work.

3. Performance Assessment

As noted in previous Quarterly Progress Reports, the SCA had identified the need for DOE to be more conservative in its approaches to treating uncertainty in its investigations and analyses. During this reporting period, there were no new issues regarding conservatism, deserving Commission attention.

4. Early Resolution of State and Tribal Concerns

As reported in the March 4, 1991, Quarterly Progress Report, the U.S. Supreme Court rejected Nevada's appeal on its "notice of disapproval" lawsuit, thereby letting stand the U.S. Court of Appeals opinion that the State was premature in registering its disapproval of the study and characterization of the Yucca Mountain site. The U.S. Supreme Court, on May 20, 1991, also rejected Nevada's challenge to the Bureau of Land Management's approval of more than 51,000 acres for right-of-way, so DOE can gain access to Yucca Mountain. On March 20, 1991, the U.S. District Court in Las Vegas ordered Nevada to expeditiously process DOE environmental applications for surface-disturbance and underground-water-injection control permits. Nevada issued an air-quality permit and an underground-injection permit to DOE, on June 13 and 14, 1991, respectively. A hearing was held on July 17, 1991, before the U.S. District Court, to report on progress in processing the water-appropriation permit application. At the hearing, DOE informed the Court that Nevada has scheduled an administrative hearing on the issue of the water appropriation permit for September 24, 1991. The Court set a new hearing date of November 20, 1991 to determine what, if any, action has been taken on the permit request.

On May 20, 1991, DOE Secretary Watkins signed letters to Inyo (CA), Esmerelda, White Pine, and Eureka Counties (NV) granting them affected status under the 1982 Nuclear Waste Policy Act, as amended in 1987. This action is the result of the U.S. Court of Appeals for the Ninth Circuit ruling to vacate an earlier decision by Secretary Watkins not to designate Inyo and Esmerelda Counties as "affected units of local government" under the Nuclear Waste Policy Act (NWPA), remanding the cases to DOE for further action. The court found merit in the counties' arguments that DOE did not adequately consider the possibility of groundwater or airborne contamination in Inyo County, and transportation

by rail and highway of wastes through Inyo and Esmerelda Counties to the proposed repository at Yucca Mountain, NV. On May 21, 1991, OCRWM Director John Bartlett invited the remaining three counties contiguous to Nye County (Lander, Mineral, and Churchill) to consider applying for affected status.

There are now seven affected counties with a potential for a total of 10. The staff plans to meet with members of the affected counties once they have established their offices. The purpose of the meeting is to explain NRC's HLW program responsibilities and to address any issues the affected counties may have raised related to those responsibilities.

5. Early Resolution of Issues

During this reporting period, the staff issued for public comment the draft STP on "Investigations to Identify Fault Displacement and Seismic Hazards at a Geologic Repository." The purpose of this STP is to provide guidance to DOE on appropriate geologic repository investigations that can be used to identify fault displacement and seismic hazards. The staff considers that a deterministic approach to the investigations should be applied to DOE's site characterization program in these areas. Further, the staff considers that the approach this STP takes to the investigations of fault displacement and seismic hazards is appropriate for the collection of sufficient data for input to analyses of these phenomena, both for the preclosure and postclosure performance periods.

Also, the staff issued the final STP on "Regulatory Considerations in the Design and Construction of the Exploratory Shaft Facility (ESF)" as NUREG-1439. The staff issued the STP to provide regulatory guidance to DOE on an approach acceptable to the NRC staff for consideration of 10 CFR Part 60 requirements in the ESF design. It is a compilation of previous NRC staff positions on this subject transmitted to DOE and is based on the premise that the ESF will eventually become part of a future geologic repository.

Finally, the staff issued the draft STP on "Geologic Repository Operations Area Underground Facility Design -- Thermal Loads" for public comment. This STP provides regulatory guidance to DOE on acceptable methodologies for demonstrating compliance with 10 CFR 60.133(i). The staff's

position is that DOE should develop and use a defensible methodology to demonstrate the acceptability of a geologic repository operations area (GROA) facility design. The NRC staff currently anticipates that this methodology will require development of fully coupled models to account for the thermal, mechanical, hydrological, and chemical processes that are induced by the thermal load. The GROA underground facility design: (1) should satisfy design goals/criteria initially selected by considering the performance objectives; and (2) must satisfy the performance objectives 10 CFR 60.111, 60.112, and 60.113.

6. Monitored Retrievable Storage (MRS)

The staff provided comments on DOE's QA requirements and program description documents applicable to the storage of spent fuel and HLW at an MRS. The documents were found to be generally acceptable, and recommendations were made to modify appropriate sections to be similar to those sections on the repository program.

On June 17, 1991, staff met with DOE OCRWM staff to discuss MRS strategy, project status, and schedules. DOE presented its initial approach to the MRS conceptual design. Current DOE plans include pre-licensing interactions, with NRC, relating to the development of a safety analysis report (SAR) for the MRS, concurrent with the preparation of a draft environmental impact statement. The DOE schedule calls for SAR development in 1993 and submittal to NRC for review in March 1994, nearly 1 year before the MRS license application. The discussion also covered mechanisms for future interactions and potential topics for discussion. Topics include NRC participation in the National Environmental Policy Act process for the MRS and a possible NRC/DOE Memorandum of Understanding (MOU) for pre-license application interactions and SAR review.

7. Transportation

During this reporting period, the staff met with DOE and Babcock and Wilcox on the design of the Model No. BR-100 barge/rail cask. This cask has the capacity to transport 52 boiling-water reactor assemblies or 21 pressurized-water reactor assemblies. The meeting was held to specifically discuss credit for spent fuel burnup in the criticality analysis for the cask design. Additional meetings will be held to further discuss end effects, measurement techniques, and low-density moderator effects.

8. Research

During this reporting period, staff from NMSS and RES participated in two meetings of the NWTRB. The first meeting was on Natural Analogs and was held in Reno, Nevada, on April 16-17, 1991. RES staff presented an overview of research projects and plans in the area of natural analogs, and a Center for Nuclear Waste Regulatory Analyses (CNWRA) representative presented a progress report on the CNWRA's analog research project. The RES overview included work on the International Alligator Rivers Analog Project (ARAP), the Valles Caldera Natural Analog Project, and a preliminary view of a plan under development in RES to look at analogs from a total program perspective. After the meeting, RES and CNWRA staff, in cooperation with a staff geologist from the Nevada Bureau of Mines and Geology, conducted preliminary field visits to two potential analog research sites in the McDermitt Caldera and Virgin Valley, both in northern Nevada.

The second NWTRB meeting covered performance assessment and was held in Arlington, Virginia, on May 20-21, 1991. NMSS and RES staff presented a report of activities on HLW performance assessment.

Immediately after the NWTRB analogs meeting, staff attended an ARAP modeling workshop and INTRAVAL workshop in Seattle, Washington. Since ARAP is one of the problems being modeled in INTRAVAL, it was convenient to bring the participants together in one place to jointly review progress at the technical level. In June 1991, the ARAP held a second workshop in Sydney, Australia, for all ARAP participants, which was followed by a meeting of the international Joint Technical Committee (JTC), which oversees the project. RES participated in the workshop, the subsequent JTC meeting, and a field trip to the Alligator Rivers field site. This was an important meeting for the project, since plans for completing the initial work scope and producing final reports during the last year were under discussion. Also presented were preliminary ideas for a highly focused extension that could be a very productive and important effort built on the foundation of the earlier work.

In the area of rock mechanics, RES sent a representative to the initial meeting of DECOVALEX, an international project being organized by the Swedish Nuclear Power Inspectorate (SKI), to examine the validation of discrete element codes used to evaluate coupled thermal-hydrologic-mechanical effects with regard to repository performance. RES is pursuing plans to participate in DECOVALEX with both staff and CNWRA involvement.

RES began efforts to explore the problem of volcanism near the Yucca Mountain site on two fronts. First, the CNWRA was given a scope of work for a project to begin evaluating information available on the regional structures controlling the volcanism. Second, a detailed agreement with the Johns Hopkins University's Department of Earth and Planetary Sciences was approved in which a staff member will be working approximately half-time, on research on volcanism directly related to NRC's needs in this technical area.

9. Nuclear Waste Negotiator

As reported in SECY-91-125, on February 8, 1991, the Nuclear Waste Negotiator sent a letter to then NRC Chairman Carr, suggesting the development of an MOU between NRC and the Office of the U.S. Nuclear Waste Negotiator, similar to the MOU between DOE and the Negotiator. At present, the staff is drafting a proposed MOU that primarily reflects NRC's regulatory role and mission in the HLW program. The staff plans to forward this MOU to the Negotiator, as a first step in opening a dialogue.

Note:

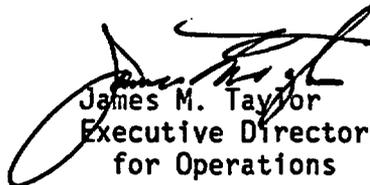
Shortly after the end of this reporting period, the NRC Onsite Representatives at the Yucca Mountain, Nevada, site were informed that DOE plans to begin site characterization work on July 9, 1991. The work will include: (1) a renewal of activities in Trench 14, to evaluate calcite/silica deposits; (2) work on a new trench in Midway Valley, Trench A, located at the site of the north portal of the Exploratory Studies Facility shaft; and (3) soils work at Lathrop Wells, to date the volcanic cones at that site. The staff has reviewed the study plans associated with these activities and identified no objections to starting work on the activities. DOE also informed the Onsite Representatives that it will have a 100,000-gallon storage facility for water, and expects to use 50,000 gallons per day for dust control. The water will be trucked onto the site from California, thus allowing initiation of site characterization activities prior to a decision on the water-use permit. DOE expects that digging will be done for about 2 weeks before any scientific investigations can begin. Three additional boreholes will be drilled at the USGS building. Although they are not part of site characterization, hydrologists will use them as prototypes, to test the use of equipment.

Coordination:

The Office of the General Counsel has reviewed this paper and has no legal objection.

Conclusion:

The staff and DOE are continuing to make progress in addressing and resolving issues. During this reporting period, there were positive indicators that DOE is considering NRC concerns in its program. There were no issues that required Commission action.



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