

MAR 2 9 1993

Mr. Lake H. Barrett, Acting Director
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

89001838

Dear Mr. Barrett:

SUBJECT: TRANSMITTAL OF THE QUARTERLY PROGRESS REPORT ON THE PRE-LICENSING PHASE OF THE CIVILIAN HIGH-LEVEL RADIOACTIVE WASTE MANAGEMENT PROGRAM

Enclosed for your information is a copy of SECY-93-052, the "Quarterly Progress Report on the Pre-Licensing Phase of the U. S. Department of Energy's (DOE's) Civilian High-Level Radioactive Waste Management Program." The Nuclear Regulatory Commission staff prepares Quarterly Progress Reports in order to provide the Commission with an assessment of progress being made on key aspects of the NRC and the DOE pre-licensing consultation program. This report covers the period from October through December 1992.

If you have any questions, please contact me at (301) 504-3352, or Mr. Joseph Holonich of my staff, at (301) 504-3387.

Sincerely, *Original signed by*
Guy A. Arlotto
Robert M. Bernero, Director
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

- cc: R. Loux, State of Nevada
- T. J. Hickey, Nevada Legislative Committee
- C. Gertz, DOE/NV
- M. Murphy, Nye County, NV
- M. Baughman, Lincoln County, NV
- D. Bechtel, Clark County, NV
- D. Weigel, GAO
- P. Niedzielski-Eichner, Nye County, NV
- B. Mettam, Inyo County, CA
- V. Poe, Mineral County, NV
- F. Sperry, White Pine County, NV
- R. Williams, Lander County, NV
- P. Goicoechea, Eureka County, NV
- L. Vaughan II, Esmeralda County, NV
- C. Shank, Churchill County, NV
- E. Holstein, Nye County, NV.

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March 3, 1993

POLICY ISSUE
(Information)

SECY-93-052

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 (October through December 1992) 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 Report on the pre-licensing phase of DOE's program, the Nuclear Regulatory Commission staff discusses the key aspects of the NRC/DOE pre-licensing consultation program that deserve Commission attention. The previous Quarterly Progress Report, SECY-92-392, discussed activities that occurred from July through September 1992.

Executive Summary: The most significant activities during this period were related to the areas of "DOE Implementation of Scheduled and Systematic Consultations" and "Rulemaking and Regulatory Guidance and Development."

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Contact:
Ken Kalman, NMSS
504-2428

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DOE Implementation of Scheduled and Systematic Consultations

- o By letter of November 2, 1992, the staff notified DOE that the NRC was lifting its Site Characterization Analysis (SCA) Objection 1, related to DOE's Title I design control process for the Exploratory Studies Facility (ESF) and the adequacy of the Title I design. The NRC staff determined that: (1) DOE has demonstrated that the quality assurance (QA) aspects of an acceptable design control process are being applied to its design activities; (2) the Title II design for the ESF has been expanded to address the requirements of 10 CFR 60.21; (3) DOE has demonstrated that currently available technical data are being integrated into decisions related to ESF design; and (4) the ESF proposed test space has been expanded to avoid possible test interferences. NRC no longer has any open objections related to DOE's site characterization program.
- o The NRC On-site Representatives (ORs) observed the start of construction for the ESF that included an access road to the ESF site and a pad for the north portal operations. The road and pad are being constructed to facilitate initiation of work, in April 1993, on a tunnel approximately 28 feet in diameter and 200 feet long, into Exile Hill, to serve as the staging area for a Tunnel Boring Machine (TBM). The TBM will be used to excavate most of the ESF ramps and underground areas.

Rulemaking and Regulatory Guidance Development

- o On December 11, 1992, the staff submitted the proposed rulemaking on, "Design Basis Events for the Geologic Repository Operations Area," to the Commission for consideration. The staff anticipates publication for public comment in March 1993.

Discussion:

1. DOE Implementation of Scheduled and Systematic Consultations

Several interactions were conducted with DOE during this reporting period. On October 29, 1992, the NRC and DOE staff conducted a technical exchange on "Application of Systems Engineering to the High-Level Radioactive Waste Repository Program," in San Antonio, Texas. The objective of this technical exchange was to provide an overview of how systems engineering is being applied in the NRC regulatory program and a preliminary view of DOE's program application of systems engineering. The meeting was attended by representatives from DOE, DOE

contractors, the Center for Nuclear Waste Regulatory Analyses (CNWRA), the State of Nevada, and Nye County, Nevada.

On November 18, 1992, the staff transmitted a letter to DOE that took stock of the interactions between the two agencies to ensure the continuation of an effective pre-licensing program that focuses on resolution of issues in an open and timely manner. The letter discussed issues related to: (1) resolution of concerns documented in the staff's SCA; (2) improved focus for NRC/DOE interactions; (3) timely submittal of DOE Site Characterization Progress Reports; (4) identification by DOE of needed NRC guidance; (5) timely development of the Licensing Support System; and (6) the process for dealing with some of the more contentious issues related to the development of the revised U.S. Environmental Protection Agency's (EPA's) standards for the disposal of HLW.

The letter also discussed four issues from the staff's SCA on the need to: (1) conduct periodic total system performance assessments to provide early and ongoing evaluation of the adequacy of data being gathered and the ability of the site to meet the 10 CFR Part 60 performance objectives, (2) direct early attention to investigations related to the understanding of tectonic phenomena and consideration of a full range of appropriate tectonic models, (3) improve technical integration of the overall site characterization program, and (4) systematically integrate all studies to ensure that results will provide the data necessary to differentiate among the various models under consideration.

During its December 18, 1992, briefing to the Commission on the status of the Civilian Radioactive Waste Management Program, DOE responded to the issues raised in the staff's November 18, 1992, letter. However, additional follow up will be needed to ensure implementation of activities that are responsive to the staff's letter.

On November 24, 1992, the NRC and DOE staff conducted an interactions scheduling meeting attended by the State of Nevada at DOE Headquarters. The purpose of the meeting was to establish a schedule of interactions between NRC and DOE staff for the period of January through June 1993. The topics of the scheduled interactions that were agreed on by NRC and DOE are: NRC's observation of DOE's Waste Isolation Pilot Project round table discussion; DOE's approach to resolving volcanism-

related study plan and site characterization concerns; DOE's approach to the integration of geophysical activities with other site characterization activities; DOE's use of topical reports; DOE's presentation and an NRC staff site visit of ongoing activities at Yucca Mountain (e.g., Quaternary faulting within the site area, and the ESF); DOE's overview of its program planning and integration processes; and DOE's treatment of NRC requirements contained in 10 CFR Parts 60, 71, and 72.

On December 14-15, 1992, NRC and DOE conducted a technical exchange to discuss their respective performance assessment programs. The NRC staff presented the approaches taken and methodologies used in Phase 2 of its Iterative Performance Assessment (IPA) effort, which is nearing completion, and discussed preliminary plans for future IPA work. DOE presented results from its recently completed total system performance assessments for Yucca Mountain, Nevada, which were conducted in parallel efforts at Sandia National Laboratories (SNL) and Pacific Northwest Laboratory (PNL). The NRC staff intends to review reports of the SNL and PNL work as part of Phase 3 of its own performance assessment development efforts. Issues discussed at the technical exchange included: (1) the hydrology of the Yucca Mountain site and its effect on radionuclide transport; (2) consequence modeling of disruptive events, such as volcanism and human intrusion (exploratory drilling); (3) representation of uncertainty in parameter distributions; and (4) construction of complementary cumulative distribution functions representing releases from the repository and used to demonstrate compliance with the EPA standard.

On December 17, 1992, the staff received DOE's comments on the draft revisions to the Procedural Agreement and the Repository Project-Specific Agreement. These agreements outline the procedures for staff interface, consultation, and exchange of information between the two agencies, during site characterization. Although DOE found most of the staff's revisions acceptable, there are a few issues requiring additional negotiation. These include such topics as what can be agreed to at licensing and management meetings and how the staff will handle DOE classified and privileged information. The staff is currently reviewing DOE's comments, and anticipates finalizing these agreements by the middle of 1993.

During this reporting period, the ORs observed many of the site activities related to DOE's site characterization program. In particular, the ORs observed the start of construction for the ESF, which began on November 30, 1992, with the construction of an access road to the ESF site and a pad for the north portal operations. The ESF access road and pad are being prepared for initiation of work, in April 1993, on a tunnel approximately 28 feet in diameter and 200 feet long, into Exile Hill, to serve as the staging area for a TBM. DOE plans to use the TBM to excavate most of the ESF ramps and underground areas.

Other site characterization work observed by the ORs included a continuation of the monitoring programs for seismic, water infiltration and level, weather, and environmental data. Activities included drilling of shallow and deep boreholes to study hydrologic properties of the unsaturated and saturated zones, trenching in areas of known or possible faults, grouting of existing boreholes, and geologic mapping and sampling to gather information pertinent to volcanism and faulting studies. In addition to these activities, during this reporting period, the ORs also briefed DOE and DOE contractors at the Yucca Mountain Field Operations Center on the role of the NRC and the ORs in the HLW program.

On December 10, 1992, DOE transmitted "Progress Report on Site Characterization: Yucca Mountain, Nevada, Number 6" for review. The staff subsequently received "Site Characterization Progress Report: Yucca Mountain, Nevada, Number 7" on December 31, 1992. The two reports describe the progress of site characterization for the periods of October 1, 1991, through March 31, 1992, and April 1, 1992, through September 30, 1992. The progress reports are required by the Nuclear Waste Policy Act and 10 CFR Part 60, and should include significant results of site characterization work completed, the status of all site characterization activities and study plans under development, and details of site monitoring activities. The staff will review these reports to determine if DOE has been responsive to staff comments on previous progress reports and to determine if these most recent reports are responsive to the staff's request that DOE also discuss progress toward the resolution of the SCA concerns and any concerns regarding DOE study plans.

In addition to the progress reports, in December 1992, DOE also transmitted 6 site characterization study plans for the staff's review and plans to issue 32 additional

study plans in fiscal year 1993. DOE will request that the staff expedite reviews of 5 of these study plans that deal with tests to be conducted in the ESF. DOE plans to issue two topical reports, four technical reports, one annotated outline, and an additional progress report in fiscal year 1993.

As reported in a previous Quarterly Progress Report, the staff originally identified two objections in its review of DOE's Site Characterization Plan and documented them in the SCA. Objection 2, which dealt with staff concerns about the lack of an acceptable DOE Office of Civilian Radioactive Waste Management (OCRWM) QA program, was lifted by letter of March 2, 1992. During this reporting period, the NRC staff notified DOE, by letter of November 2, 1992, that the NRC was lifting SCA Objection 1, related to DOE's Title I design control process for the ESF and the adequacy of the Title I design. The NRC staff determined that, based on information provided by DOE: (1) DOE has demonstrated that the QA aspects of an acceptable design control process are being applied to its design activities; (2) the Title II design for the ESF has been expanded to address the requirements of 10 CFR 60.21; (3) DOE has demonstrated that currently available technical data are being integrated into decisions related to ESF design; and (4) the ESF proposed test space has been expanded to avoid possible test interferences. With the lifting of Objections 1 and 2, NRC no longer has any open objections related to DOE's site characterization program.

On December 24, 1992, DOE submitted a revised working draft of the "Level-of-Detail Agreement for DOE Study Plans," to NRC, for its review. The working draft appears to be responsive to NRC's concerns, and the staff plans to reach agreement with DOE on a final revised agreement during the next quarterly reporting period.

During this reporting period, there were no specific interactions between DOE and EPA on issues concerning mixed HLW or the Resource Conservation and Recovery Act.

2. Early Implementation of a QA Program

The NRC staff completed its initial review of the Management and Operating (M&O) Contractor Quality Assurance Program Description (QAPD) and transmitted comments to DOE by letter dated October 21, 1992. The acceptability of the M&O Contractor QAPD will be determined in the staff's review when the next revision

is transmitted to NRC. The previous Quarterly Progress Report discussed NRC's position that OCRWM should apply the same steps of review and approval to the M&O Contractor QA program that were previously applied to DOE HLW program participants. Although OCRWM declined to commit to the process recommended by NRC, the staff took the position that it would follow the same procedures for the M&O contractor as it did for the other participants. Therefore, the staff would be able to obtain the same degree of confidence for this program as it had for others, and now considers this issue resolved.

During this reporting period, NRC and CNWRA QA and technical staff observed OCRWM audits of the U.S. Geological Survey, the Los Alamos National Laboratory, and OCRWM (Headquarters and the Yucca Mountain Quality Assurance Division). No findings were identified that would preclude DOE from continuing with surface-based site characterization or other quality-affecting activities. The ORs performed QA reviews of Yucca Mountain Site Characterization Project Office activities, at the Yucca Mountain Site, pertaining to the quality-related controls associated with drilling, coring, and processing of core. The ORs also participated in the evaluation of controls pertaining to the implementation of the DOE QA program regarding ongoing field work. This included an evaluation of procedures, training and qualification of personnel, and the documentation of evidence demonstrating compliance with these procedures. The ORs identified no problems.

A meeting was held on October 28, 1992, at which OCRWM presented the latest revision of its draft Quality Assurance Requirements and Description Document (QARD). A representative of the State of Nevada attended the meeting. The QARD was last accepted by NRC on November 21, 1991. DOE is currently revising the QARD to consolidate the OCRWM QARD and QAPD into one document. The draft QARD is intended to incorporate and clarify all QA program requirements into a single document that can be used by all organizations in the DOE HLW program. The NRC staff has reviewed the draft document and discussed the need for further information and clarification on some items, with OCRWM, in telephone conversations that included a State of Nevada representative.

3. Performance Assessment

The NRC staff attended workshops in Paris, France (October 7-9, 1992) and in Albuquerque, New Mexico

(November 18-20, 1992), at which the potential use of expert judgment for repository licensing was discussed. At the October workshop, it was clear that the more formal uses of expert judgment are under active consideration only in the United States and Great Britain. Plans for using expert judgment in Europe and Canada involve relatively informal methods. Both workshops consisted of presentations by decision analysts and "case history" discussions of experiences with expert judgment by those involved in waste management. The workshops provided a valuable opportunity for exchange of information, but neither workshop reached any substantive conclusions regarding appropriate uses of expert judgment in nuclear waste disposal programs.

In early December 1992, the National Academy of Sciences' (NAS') Board on Radioactive Waste Management (BRWM) released its report on five of seven tasks undertaken by DOE to provide technical support, to EPA, for its HLW standards. (The NRC staff had observed DOE's presentation of these five tasks to the BRWM on September 23-24, 1992.) The BRWM agreed with DOE that a collective dose option (as opposed to cumulative release limits) and separate release limits for releases to different locations in the biosphere deserve further EPA consideration. However, the BRWM found DOE's analyses and recommendations unconvincing regarding (1) DOE's proposed treatment of human intrusion, (2) increasing uncertainties with longer regulatory times, and (3) release limits for transuranic wastes. With respect to human intrusion, the BRWM stated its view that "useful analysis can and should be done with respect to human intrusion. An analysis of the probability of human intrusion can, for example, aid in discriminating among potential repository sites and encourage a great emphasis on designing disposal systems capable of mitigating the effects of human intrusion."

4. Early Resolution of State and Tribal Concerns

During this reporting period, a member of the Office of State Programs' staff participated in the National Conference of State Legislatures Legislative Working Group on Monitored Retrievable Storage (MRS) meeting, which was held November 17-20, 1992, in Williamsburg, Virginia. The meeting included tours of the Independent Spent Fuel Storage Installations at Calvert Cliffs and Surry. Issues discussed by the working group included: the status of MRS grant applications; the Energy Policy Act of 1992 (EnPa) impact on MRS; State-tribal relations in MRS siting; benefits from hosting an MRS; community

involvement; and public perception of risk.

5. Rulemaking and Regulatory Guidance Development

On December 11, 1992, the NRC staff submitted the proposed rulemaking on "Design Basis Events for the Geologic Repository Operations Area," to the Commission for consideration. The staff anticipates that publication of the proposed rulemaking for public comment will occur in March 1993.

In November 1992, the staff briefed the ACNW on a proposed Staff Technical Position (STP) entitled "Consideration of Fault Displacement Hazards in Geologic Repository Design." This STP addresses the acceptability of designing the geologic repository to take into account the attendant effects (e.g., displacement) of faults of regulatory concern and expresses the staff's views on what is needed from DOE if it chooses to locate structures, systems, and components important to safety or important to waste isolation in areas that contain faults of regulatory concern. After the briefing, the ACNW endorsed the staff's proposed positions in the STP, and recommended that it be issued for public comment. The staff expects this STP to be available for public comment in 1993.

The last Quarterly Progress Report discussed, in detail, the staff's work on its final STP on "Geologic Repository Operations Area Underground Facility Design - Thermal Loads." The final STP was published as NUREG-1466 in December 1992.

6. MRS

In November 1992, the staff forwarded comments to DOE on DOE's August 31, 1992, revision of the "Monitored Retrievable Storage Facility Annotated Outline Skeleton Text for the Preparation of a License Application" (MRS AO). Two iterations per year of the MRS AO are now anticipated.

As noted in greater detail in the last Quarterly Progress Report, a number of groups have expressed interest to DOE in hosting an MRS site. There are currently eight active Phase I applicants. DOE has four Phase I applications under review. Additionally, there are nine groups that are no longer pursuing the possibility of hosting an MRS. On October 29, 1992, NRC staff met with Fort McDermitt Indian Reservation representatives to discuss the NRC licensing process.

Fremont County, Wyoming, completed its Phase I study relating to siting of an MRS. However, Governor Mike Sullivan decided to halt the county's efforts to obtain Phase IIa grant funding, thereby eliminating Fremont County as a potential host MRS site. The Mescalero Apache Indian Tribal Council of Mescalero, New Mexico, is the only group to have received funding for the first of a two-part Phase II grant from DOE. The Mescalero Apache Indian Tribal Council is using the funding to continue its fact-finding studies and public information efforts. The deadline for applying for Phase II grants was to have expired on September 30, 1992; however, DOE extended the filing deadline to March 31, 1993.

On November 20, 1992, the staff met with DOE to discuss physical protection of the MRS. The meeting focused on the design basis threat, interim licensing criteria for spent fuel storage, and revisions to 10 CFR Parts 73.50 and 73.37. On December 17, 1992, the NRC staff met with DOE to discuss its Multi-Purpose Cask (MPC) study. The meeting focused on preliminary design concepts, evaluation scenarios and criteria, and MPC advantages and disadvantages.

DOE, in a letter from the Secretary of Energy, to Senator J. Bennett Johnston, dated December 17, 1992, outlined a new strategy to provide interim storage of commercial spent nuclear fuel in 1998. DOE stated that, since the Office of the U.S. Nuclear Waste Negotiator has not been able to identify a candidate MRS site that can be recommended to Congress by June 1993, that Congress should authorize and require DOE to select candidate Federal sites by December 31, 1993. DOE also mentioned this strategy in its December 18, 1992, briefing to the Commission on the status of the Civilian Radioactive Waste Management Program.

7. Spent Fuel Storage and Transportation System Compatibility

The Sacramento Municipal Utility District (SMUD) is considering the selection of the standardized NUHOMS-24P spent fuel storage design as part of a DOE cooperative program to demonstrate the licensing of a dual-purpose storage/transport system for its Rancho Seco independent spent fuel storage installation. A meeting was held with SMUD, in December 1992, to discuss potential licensing issues. DOE indicated, in its meeting with the NRC staff, on December 17, 1992, that the SMUD cooperative program and the MPC study are part of its efforts to facilitate the compatibility of at-reactor

dry storage with the civilian radioactive waste management system. Additionally, Virginia Power, Westinghouse Electric Corporation, and Newport News Shipbuilding are pursuing a joint cooperative agreement, with DOE, to develop the Universal Container System (UCS). Virginia Power, in a December 16, 1992, letter to the Secretary of Energy, has requested that DOE consider a cooperative agreement for the development of a UCS to integrate spent fuel storage activities from the reactor spent fuel pool to the repository. The UCS would consist of a basic metal container with three separate overpacks for transportation, temporary storage, and permanent disposal.

8. Transportation

There have been no significant developments in transportation during this reporting period.

9. Research

In October 1992, the staff, contractors, and consultants participated in the Natural Analogue Working Group (NAWG) workshop, organized by the Commission of European Communities, in Toledo, Spain. They presented results of NRC-supported research of natural analogues at Peña Blanca, Mexico; Santorini, Greece; and Alligator Rivers, Australia. DOE representatives also presented results of DOE-supported natural analogue work at Pocos de Caldes, Brazil. The workshop provided the forum for the final presentation of research results from the Alligator Rivers Analogue Project, which NRC initiated and which later became an international cooperative effort coordinated by the Nuclear Energy Agency of the Organization for Economic Cooperation and Development. The NAWG is emphasizing the use of natural analogue research results, in model validation, that will provide bases for confidence in mathematical models used in HLW performance assessments.

CNWSA hosted the 1992 U.S. session of INTRAVAL, an international transport model validation program coordinated by Sweden's Nuclear Power Inspectorate, in November. Results from NRC-supported test cases at the Apache Leap Tuff Site in Arizona and the Las Cruces Trench Site in New Mexico were presented. DOE and the State of Nevada representatives presented results from INTRAVAL's Yucca Mountain test case.

Also in November 1992, the staff hosted a workshop on all of NRC's HLW and low-level radioactive waste research associated with geochemistry. The HLW projects

represented were the geochemistry, sorption modeling, and natural analogue research projects at CNWRA and the field hydrogeology project at the University of Arizona, where NRC-supported investigators are measuring the ages of groundwater in fractures and surrounding rock matrices at the Apache Leap Tuff site. The workshop provided an opportunity for geochemists to exchange ideas in areas of common interest and to obtain peer review of their work in such areas as sorption modeling and natural analogues. The staff intends to use the results of the workshop to revise geochemistry research in these areas.

10. Nuclear Waste Negotiator

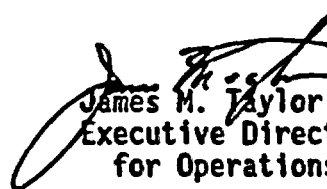
NRC continued to support the Office of the U.S. Nuclear Waste Negotiator by responding to requests for information and meetings with interested parties to explain NRC's regulatory responsibilities.

Conclusions:

NRC and DOE continued to make progress in addressing and working toward resolving issues at the staff level. During this reporting period, the NRC lifted SCA Objection 1, related to DOE's Title I control process for the ESF and the adequacy of Title I design. Finally, during this reporting period, the proposed rulemaking on "Design Basis Events for the Geologic Repository Operations Area" was forwarded to the Commission for consideration.

Coordination:

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


James M. Taylor
Executive Director
for Operations

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