



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

August 11, 1995

Dr. Daniel A. Dreyfus, Director
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

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

Dear Dr. Dreyfus:

Enclosed for your information is a copy of the Nuclear Regulatory Commission staff's "Semi-Annual Progress Report on the Pre-Licensing Phase of the U.S. Department of Energy's Civilian High-Level Radioactive Waste Management Program" (SECY-95-197). The Semi-Annual Progress Report (SAPR) provides the Commission an assessment of progress being made on key aspects of the NRC and the Department of Energy (DOE) pre-licensing consultation program. This report covers the period from October 1994 through March 1995. As noted in the report, this will be the last SAPR produced and the staff will use periodic briefings to keep the Commission informed of interactions with DOE.

As noted in the enclosed SAPR, NRC and DOE staff continued to make progress in addressing and resolving issues at the staff level. DOE's implementation of its new Program Approach was a significant step towards streamlining the site characterization process. However, my staff is still concerned that it has not been provided with enough information to determine whether the Program Approach will develop sufficient data to demonstrate compliance with 10 CFR Part 60. As a result, my staff is planning to conduct a series of "vertical slice" evaluations of DOE's work on selected key technical issues to assess the sufficiency of the new Program Approach for collecting licensing data. The NRC staff fully understands that Congressional actions currently under consideration may have dramatic program implications.

It is apparent that DOE is taking steps toward resolving the NRC staff's ongoing concerns with the Management and Operating Contractor quality assurance program. In April 1995, my staff conducted an in-field verification of corrective actions that DOE had taken and found that, within the scope of the in-field verification, they were accomplished acceptably. Additional follow-up work is planned.

During this reporting period, videoconferencing was successfully used for several interactions between NRC and DOE. I believe that this capability adds to our abilities to resolve issues and further improve our policy of openness to the State of Nevada and other parties to the high-level radioactive waste repository program.

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D. Dreyfus

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I look forward to continued progress in resolving issues at the staff level. If you have any questions, please contact me at (301) 415-7800, or Mr. Joseph Holonich of my staff at (301) 415-7238.

Sincerely,

Original signed by Carl J. Paperiello

Carl J. Paperiello, Director
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

- cc: R. Loux, State of Nevada
- J. Meder, Nevada Legislative Counsel Bureau
- W. Barnes, YMPO
- R. Milner, DOE/Wash DC
- C. Einberg, DOE/Wash, DC
- M. Murphy, Nye County, NV
- M. Baughman, Lincoln County, NV
- D. Bechtel, Clark County, NV
- D. Weigel, GAO
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- B. Mettam, Inyo County, CA
- V. Poe, Mineral County, NV
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- L. Florenzi, Eureka County, NV
- J. Hoffman, Esmeralda County, NV
- C. Schank, Churchill County, NV
- L. Bradshaw, Nye County, NV
- W. Barnard, NWTRB
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- A. Melendez, NIEC
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- R. Arnold, Pahrump, NV
- N. Stellavato, Nye County, NV

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NAME	KLKAlman:cc/dh		JThoma		JHolonich		JGreeves		MKnapp
DATE	08/ /95		08/ /95		08/ /95		08/ /95		08/ /95
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DATE	08/11/95								

D. Dreyfus

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DATE	08/8/95	08/4/95	08/7/95	08/10/95	08/ /95		
OFC	NMSS						
NAME	CJPaperiello						
DATE	08/ /95						



July 27, 1995

POLICY ISSUE
(Information)

SECY-95-197

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: SEMI-ANNUAL 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 Semi-Annual Progress Report (SAPR) on the pre-licensing phase of the U.S. Department of Energy's (DOE's) civilian high-level radioactive waste (HLW) management program. This report covers the period of October 1994 through March 1995. However, the current status of significant events is also included in this SAPR. In accordance with COMSECY-95-017, "Periodic Reports/Meetings Required by the Commission," this will be the last SAPR.

BACKGROUND:

In the SAPR on the pre-licensing phase of DOE's program, the U.S. Nuclear Regulatory Commission staff discusses the key aspects of the NRC/DOE pre-licensing consultation program that deserve Commission attention. The previous SAPR, SECY-94-279, discussed activities that occurred from January through September 1994.

SUMMARY:

The most significant activities during this reporting period were related to the areas of "DOE Implementation of Scheduled and Systematic Consultations" and "Early Implementation of a Quality Assurance Program (QA)." In the area of "DOE Implementation of Scheduled and Systematic Consultations," DOE implemented its new Program Approach. The DOE Program Approach is aimed at streamlining the process for determining site suitability, site

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Contact: Ken Kalman, NMSS
415-6664

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characterization, and development and submittal of its license application. Although the NRC staff believes that intended improvements in integration will result in program improvements, the NRC staff has concerns with several aspects of the Program Approach. Before the Program Approach, DOE had provided the statutorily required Site Characterization Plan (SCP), which contained a site characterization program baseline, and SCP Progress Reports to update the program status. The NRC review of the SCP was focused on the sufficiency of data collected to support the licensing process. The Program Approach streamlines the SCP process and therefore affects the data collected to support both site characterization and licensing. The NRC staff has not been provided, either through SCP Progress Reports or other documentation, with enough details to determine if the Program Approach will develop sufficient data to demonstrate compliance with the Commission's regulations for licensing a HLW repository (10 CFR Part 60). The staff is, therefore, planning to conduct a series of independent "vertical slice" evaluations of DOE's work under the Program Approach of selected key technical issues to assess the sufficiency of the program for collecting licensing data.

In the area of "Early Implementation of a QA Program," the NRC staff has had ongoing concerns that DOE's Management and Operating Contractor (M&O) has not been implementing its QA program for design and design control of the Exploratory Studies Facility (ESF) in an acceptable manner. These concerns were documented in a letter to DOE. In response to this letter, both DOE and the M&O agreed to take necessary corrective actions to prevent the recurrence of NRC concerns and developed a six-point management plan to initiate measures for appropriate corrective action. The NRC staff then conducted an in-field verification of the M&O on April 3-6, 1995, to determine whether the corrective actions committed to were being accomplished acceptably. The NRC staff found that, within the scope of the in-field verification, M&O compliance with its commitments was satisfactory. Additional follow-up actions are planned for the late FY 1995-early FY 1996 time frame depending upon receipt of additional documentation which DOE plans to submit in late July 1995.

In the area of "Performance Assessment," the staff continued its work relating to the use of expert judgment in performance assessment for a HLW repository. In fall 1995, the staff plans on issuing draft guidance presenting a protocol for formal expert elicitation along with a description of the general conditions that may warrant the use of a formal elicitation process.

The staff continued to make progress in the area of "Early Resolution of State and Tribal Concerns." Most noteworthy are the steps the staff has taken to improve communication between NRC and the Indian tribes, such as making computers available to the tribes and the use of videoconferencing.

In the area of "Rulemaking and Regulatory Guidance," the staff completed one rulemaking for Commission review, published one regulatory guide related to the review of DOE's license application for the HLW repository and has plans to publish another regulatory guide on topical guidelines for the Licensing Support System (LSS). The staff also provided comments on documents related to the U.S. Environmental Protection Agency (EPA) standards for HLW disposal.

Work continued in the areas of "Monitored Retrievable Storage," "Spent Fuel Storage and Transportation System Compatibility," "Transportation," and "Research." DOE plans on moving ahead with its plan to develop a multi-purpose canister (MPC) system of containers for storage, transport, and disposal of nuclear fuel. NRC staff provided DOE with a schedule for certification of the MPC for storage and transport and has noted that the NRC schedule depends on DOE submitting a high-quality application.

This reporting period marked the beginning of significant redirection of the NRC staff's work on the LSS. As a result, a new section has been added to this SAPR to discuss the staff's activities in this area.

DISCUSSION:

1. DOE IMPLEMENTATION OF SCHEDULED AND SYSTEMATIC CONSULTATIONS

The DOE and NRC staff continue to take a variety of initiatives toward resolving important technical issues. Although the DOE staff has taken steps to explain how it is implementing its new Program Approach, the NRC staff still has some concerns. Through interactions with DOE, the NRC staff has brought these concerns to light and will track DOE efforts toward their resolution. Although the NRC staff has concerns about implementation of DOE's Program Approach, it believes the program approach is attempting to provide better integration and streamlining of the overall program and should produce positive results. For example, although the Program Approach may result in fewer deep boreholes being drilled than originally planned, DOE plans to place more instrumentation in the holes drilled. To the extent practicable, the NRC staff will support DOE's integration activities in the Program Approach.

During this reporting period, NRC and DOE staff conducted eight meetings, four technical exchanges, and several site visits. The NRC staff observed one DOE program review and reviewed and provided comments on many DOE documents. As discussed in more detail in Section 3 of this SAPR, NRC staff also observed the first two of four workshops sponsored by DOE for the Probabilistic Volcanic Hazard Analysis Project. During this reporting period, the NRC On-site Representatives (ORs) continued to observe ongoing DOE site characterization activities.

Meetings:

During this reporting period, NRC and DOE staff held a variety of meetings, including bi-monthly management meetings, management meetings on specific issues, bi-monthly ESF meetings, and technical meetings on specific issues.

Bi-monthly management meetings were held on December 6, 1994, and February 8, 1995, to discuss issues of mutual interest related to the DOE HLW repository. Both meetings were held as videoconferences with conference locations at DOE Headquarters in Washington, D.C., and DOE's Las Vegas, Nevada office. In addition to NRC and DOE staff attending the December meeting, representatives of the Nuclear Waste Technical Review Board (NWTRB); the Center for Nuclear Waste Regulatory Analyses (CNWRA); DOE contractors; the State of Nevada; Nye County, Nevada; and Clark County, Nevada, also attended.

Other affected units of local government were notified of this meeting, but did not attend. Topics discussed included: NRC concerns on design control and the DOE M&O's QA program; DOE's concern with content requirements for topical report annotated outlines; the NRC staff proposal for limiting document submittals by DOE; and timely notification of parties of NRC/DOE interactions.

In discussing design control and the DOE M&O's QA program, the NRC staff noted an apparent lack of trending analyses across programmatic lines and, as discussed later in this SAPR, has transmitted these concerns to DOE. DOE is making changes to its program to correct these deficiencies. During the December 1994 meeting, DOE raised its concerns about the content of topical report annotated outlines. The NRC staff responded to these concerns and noted that NRC's guidance would have to be followed by DOE to submit acceptable annotated outlines. Also during the December 1994 meeting, the NRC staff identified a need to reduce the kind and number of documents that DOE will submit for NRC review. The need was brought about by changes in DOE's Program Approach and also by limits in NRC resources. As a result, NRC and DOE agreed to limit submittals to License Application Annotated Outlines, SCP Progress Reports, and four specifically identified topical reports. As part of this approach to limit submittals, information that was submitted in other formats will now be included in the annotated outlines, as appropriate. For example, DOE's total system performance assessment will be submitted as Chapter 6 of the annotated outline. The NRC staff believes that limiting submittals will better focus the HLW program on licensing and DOE's compliance with Part 60 requirements. In discussing timely notification of parties, the NRC staff noted that although it has been NRC's policy to notify participants 10 days in advance of each interaction, the faster pace of events in recent months has suggested that it may, on occasion, be necessary to schedule interactions with less than 10 days notice and to increase the number of interactions from those that were scheduled at interactions scheduling meetings. To accommodate these changes, the NRC staff and DOE representatives agreed to use videoconferencing to the extent practicable. This enhances the ability of the State of Nevada and affected units of local government to participate in meetings and also conserves NRC and DOE resources.

During the February 1995 meeting, DOE discussed its plans for preparation of the repository environmental impact statement (EIS) and a counter-proposal to limit the types of documents to be submitted to NRC to the following four types: progress reports, the license application annotated outline, topical reports, and study plans. DOE also discussed various submittals that were in preparation. NRC staff replied that it would no longer formally review DOE study plans as independent submittals. However, the NRC staff would review study plans as an integral portion of a site visit or in-field verification. The NRC staff also discussed its Open Item Tracking System and a letter it was preparing regarding harassment and intimidation. During this meeting, DOE requested that NRC name a lead contact for NRC's review of DOE's EIS for the HLW repository. By letter of March 1, 1995, NRC complied with this request by naming a Project Manager and stating that NRC would act as a commenting agency and not as a cooperating agency in the draft EIS review.

In January 1995, two management meetings were held. The first of these meetings was held on January 17, 1995, with NRC and DOE representatives meeting at DOE Headquarters, in Washington, D.C., for a videoconference with DOE's Las Vegas Office to discuss DOE's Isolation Demonstration Strategy (IDS) and Performance Allocation. Representatives of the State of Nevada; Clark County, Nevada; CNWRA; and DOE contractors also attended the meeting. The DOE representatives discussed their IDS and how it has evolved from the approach described in DOE's SCP. The DOE representatives also discussed the evolution of DOE's understanding of the performance allocation process and reaffirmed DOE's commitment to this process. The second meeting was held on January 20, 1995, to discuss DOE's proposed schedule for the multi-purpose canister (MPC). This meeting is further described in this SAPR in the section on "Spent Fuel Storage and Transportation System Compatibility."

On November 7, 1994, and January 24, 1995, NRC and DOE staff held bi-monthly technical meetings to discuss items of mutual concern regarding the ESF. The November 1994 meeting was held in Las Vegas, Nevada, and was attended by representatives of the State of Nevada; Nye County, Nevada; Clark County, Nevada; the Nuclear Energy Institute; and DOE contractors. Topics discussed included: DOE's plans for start-up of the tunnel boring machine (TBM), DOE's design and construction program, DOE's ESF Ground Support Systems, and NRC's concerns with the method that DOE was using to close corrective action reports bearing on Design Package 2C. As noted in the previous SAPR, Design Package 2C includes configuration items for north ramp excavation, linings and ground support, subsurface electrical systems, subsurface mechanical systems, subsurface fire protection, subsurface monitoring and warning systems, and subsurface conveyor systems. A site visit was held in conjunction with this meeting to observe the TBM.

The January 1995 meeting was held at NRC Headquarters in Rockville, Maryland. Representatives of the State of Nevada, NWTRB, CNWRA, and DOE contractors also attended the meeting. Affected units of local government were invited to this meeting, but did not attend. The topics discussed included: updates on ESF construction; lessons learned from operation of the TBM; ESF design control; and integration of site characterization data into the repository design process.

On October 7, 1994, NRC and DOE staff held a technical meeting to discuss NRC staff concerns with DOE's topical report entitled "Evaluation of the Potentially Adverse Condition 'Evidence of Extreme Erosion during the Quaternary Period' at Yucca Mountain, Nevada." The NRC staff was concerned that the topical report did not contain sufficient information to demonstrate absence of this potentially adverse condition. Another topical report entitled "Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain" was also discussed. More details about the NRC/DOE discussion on these two topical reports are provided in the subsection of this SAPR entitled "Comments on DOE Documents."

The previous SAPR discussed activities related to the NRC staff's concerns over the effectiveness of the DOE M&O's QA program and DOE's oversight of the program. These concerns were further documented in the NRC staff's October 13, 1994, letter to DOE. On November 1, 1994, NRC and DOE staff met to

discuss DOE's response to NRC's letter. Representatives from the M&O, the State of Nevada, local governments, NWTRB, U.S. Geological Survey, and the media attended the meeting.

In general, DOE and the M&O agreed with NRC concerns noted in the October 13, 1994, letter, and agreed to take necessary corrective actions to prevent the recurrence of the NRC concerns. A six-point management plan was developed to initiate measures for appropriate corrective action, including: (1) corrective action analyses; (2) correcting items found during audits and surveillance; (3) design process review; (4) revising procedures; (5) product quality reviews; and (6) reorganization and retraining so that the contractors better understand the licensing and QA process. On November 14, 1994, DOE transmitted a letter to NRC responding to NRC concerns. The NRC staff reviewed the DOE letter and, by letter of March 9, 1995, replied to DOE. In this letter, the NRC staff noted that it would be taking a three-phase approach to determine whether acceptable corrective actions are being implemented by DOE. The first phase was the review of the November 14, 1994, letter in which the staff concluded that the proposed corrective actions appeared to be acceptable but that the implementation of the corrective actions would have to be verified. The second and third phases will verify the design and corrective actions being completed by DOE and the M&O. The second phase consisted of a limited-scope, in-field verification which was conducted on April 3-6, 1995. Minor deficiencies were identified during the in-field verification, which DOE is correcting. Overall, the NRC staff determined that, within the scope of the in-field verification, M&O compliance with its commitments was satisfactory. This is discussed in more detail in Section 2 of this SAPR. The third phase, which will be conducted in late FY 1995 or early FY 1996, will involve a review of two DOE documents responding to NRC concerns and a limited-scope, in-field verification regarding the acceptability and effectiveness of DOE/M&O activities related to these documents. One important focus of Phase 3 will be a review of DOE's documentation demonstrating the flow-down of requirements from Part 60 to ESF construction documents. DOE has committed to provide documentation of its revised program by July 31, 1995, and NRC's Phase 3 activities will begin after this submittal is received and reviewed.

Technical Exchanges:

During this reporting period, NRC and DOE staff held several technical exchanges to discuss specific technical or regulatory topics within their areas of expertise.

On November 29 - December 1, 1994, NRC and DOE staff conducted a Technical Exchange in Denver, Colorado, to discuss ground-water flow and ground-water travel time (GWTT). As noted in the previous SAPR, this technical exchange was originally scheduled for March 1994, but was postponed to give DOE the time it needed to fully support the technical exchange. Participants included representatives of: the State of Nevada; Nye County, Nevada; Clark County, Nevada; Inyo County, Nevada; and contractors with NRC and DOE. During this Technical Exchange, DOE contractors gave presentations on their site characterization studies and prototype testing for mechanisms of fracture flow. Investigations and modeling of the disturbed zone, as well as the

calculational approach to GWTT, were also discussed. The NRC staff discussed its preliminary thinking on a potential approach for demonstrating compliance with the 10 CFR 60.113 performance objective for GWTT. The other participants at this technical exchange raised questions about the NRC's preliminary approach and it was agreed that this topic merited further consideration. However, in general, the NRC presentation was well received.

Although the NRC staff concluded that DOE is making progress in investigating unsaturated fracture flow, the staff also believes that DOE needs to further investigate approaches for characterizing fracture flow properties, and for incorporating experimental data into unsaturated flow modeling. One of the concerns raised by both NRC staff and the State of Nevada was that DOE's schedules may limit necessary feedback and interaction between modeling efforts and collection of site data. The need for more frequent interactions among NRC and DOE technical specialists was highlighted.

On December 7, 1994, NRC and DOE staff held a technical exchange to discuss DOE's proposed waste package design, DOE's plans for demonstrating compliance with the "substantially complete containment" (SCC) requirement of Part 60, and NRC's waste package material testing activities. Representatives of the State of Nevada and Nye County, Nevada, also attended. During this technical exchange, NRC and DOE staff discussed the five open items that the NRC staff had identified in its Site Characterization Analysis (SCA) related to waste package design and the requirement to maintain SCC within the waste package. Based on discussions at this exchange and its review of several DOE submittals pertaining to the five open items, on March 7, 1995, the NRC staff transmitted a letter to DOE informing DOE that it was closing the five open items remaining from its SCA. The NRC staff will now be focusing its efforts on reviewing DOE's program to design a robust waste package with a lifetime well in excess of 1000 years.

On March 29, 1995, via videoconference, NRC and DOE held another technical exchange to discuss implementation of the GWTT performance objective of Part 60. The videoconference linked NRC and DOE staff at DOE Headquarters in Washington, D.C., with other DOE facilities in Las Vegas, Nevada, and Albuquerque, New Mexico. Representatives of the State of Nevada and affected units of local government also participated in this technical exchange. This technical exchange provided the first opportunity for NRC staff to discuss DOE's approach for demonstrating compliance with the GWTT performance objective and the potential approach that NRC had presented during the November/December 1994 technical exchange. The NRC staff believes that DOE's proposed approach merits serious consideration through more detailed study. The acceptability of DOE's approach will ultimately depend on the technical validity of the approach and its consistency with the intent of the GWTT performance objective.

On May 4, 1995, NRC and DOE staff held a technical exchange in which NRC staff explained NRC's mission and its role in licensing, both generally and for the HLW repository project. Representatives of the State of Nevada; Nye and Clark Counties, Nevada; CNWRA; ACNW; and several DOE contractors also attended. The NRC staff described the Commission's regulatory role and philosophy and how it is being implemented in the HLW repository program. In its remarks, the staff

explained that while this program is unique in that NRC is regulating a first-of-a-kind facility, there is much general licensing experience which will be valuable to the licensing process. There was also a staff discussion on changes to the pre-licensing program resulting from the changes in DOE's Program Approach. Representatives of NRC's Office of the General Counsel (OGC) described the legal aspects of the licensing process and the role of the expert witness. This was particularly enlightening to many DOE staff who have never been involved in a program regulated by NRC. The DOE representatives reacted very favorably to the presentations and indicated that the staff and OGC had clarified for DOE many aspects of NRC's role.

Site Visits:

During this reporting period, the NRC staff visited the Yucca Mountain site on several occasions to gain better understanding of ESF activities. On October 17-21, 1994, NRC staff visited DOE's Yucca Mountain Field Studies Operations Center and the ESF construction pad. The purposes of the visit were to: (1) observe TBM operation; (2) collect information on DOE's current plans and schedules for excavation of the ESF using the TBM; and (3) maintain a line of communication between DOE and NRC staff during the period when there was no OR stationed near the site, to keep the NRC routinely informed about the status of ESF-TBM activities. As a result of this visit, arrangements were made with both DOE and its contractors for providing timely information on the status and progress of ESF-TBM activities.

On November 7, 1994, the staff visited the site in conjunction with an ESF bi-monthly meeting to observe activities of the TBM. Three similar visits were conducted in December 1994 and one visit was held on January 30 through February 3, 1995. These visits, during the early stages of TBM operation, enabled the NRC to maintain a presence at the site as well as a direct communication link between NRC staff and DOE and its contractors. The TBM start-up phase was significant for the ESF project, especially when the TBM transgressed the Bow Ridge Fault, the first major fault zone. The start-up phase took place at a time when there was no OR in Las Vegas, Nevada, necessitating frequent visits by NRC Headquarters staff. These visits proved most beneficial for keeping the NRC staff cognizant of developments at the ESF.

Observed Program Reviews:

Program reviews are conducted by DOE to foster communication and promote understanding among DOE, DOE contractors, and Yucca Mountain Principal Investigators (PIs) regarding the technical status, progress, and direction of the various investigations being conducted for site characterization. From February 13-17, 1995, NRC staff attended DOE's annual Technical Program Review for the Yucca Mountain Project, held in Las Vegas, Nevada. Among others in attendance were representatives of: the State of Nevada; Nye County, Nevada; Clark County, Nevada; NWTRB; CNWRA; the Nuclear Energy Institute; and several DOE contractors. The purpose of the meeting was to discuss implementation of DOE's Program Approach for the remainder of FY 1995. Although the formal presentations focused primarily on actions necessary to complete the technical basis reports to be made for the high-level findings required by DOE for site

suitability, the NRC staff and other program participants had the opportunity to question DOE on technical and programmatic issues associated with applying DOE's Program Approach to repository licensing. During the Program Review, the NRC staff became concerned that the DOE technical staff did not appear to have a full understanding of the importance of compliance with Part 60 as a primary programmatic role. As a result, the NRC staff began informal discussions with DOE technical staff on Part 60 licensing requirements. To further these discussions, NRC and DOE staff conducted a technical exchange on NRC's licensing process on May 4, 1995. This technical exchange is described in detail earlier in this SAPR.

Comments on DOE Documents:

On November 29, 1994, the NRC staff transmitted its comments on the DOE Yucca Mountain Site Characterization Project Five-Year Plan to DOE. The Plan detailed DOE's new program approach which DOE implemented on October 1, 1995, to streamline site characterization activities and to demonstrate progress in the characterization of Yucca Mountain. The NRC staff raised concerns with the Program Approach regarding the lack of information provided by DOE on the effects of the Program Approach on DOE's program to develop a full and complete license application to NRC for a repository construction authorization. The NRC staff is particularly concerned that DOE has not formally documented the changes to test and study plans, originally described in DOE's SCP and its subsequent semi-annual SCP Progress Reports, as required by Part 60. Consequently, the NRC staff needs to have an updated baseline for site characterization activities before it can adequately understand and evaluate DOE's changes to its program and the effect of those changes on licensing needs. During this reporting period, the staff discussed these concerns with DOE at bi-monthly management meetings in December 1994 and February 1995 and at a special NRC/DOE management meeting on the Program Approach's IDS. In addition, the NRC staff observed DOE's technical program review in February 1995. None of these interactions provided the staff with the information it believes is necessary to make a final determination on the acceptability of the Program Approach for collecting sufficient data to support licensing.

The staff has requested that DOE document changes to the SCP baseline in either the SCP Progress Reports or in its Annotated Outline for the License Application. To date, full documentation has not appeared in either of these documents. Because of the time lag necessary to incorporate information in these documents and DOE's accelerated schedule, the NRC staff is planning to undertake a series of independent evaluations of DOE's work under the Program Approach in certain key technical areas. This "vertical-slice" approach will be initiated within the next six months.

Past Quarterly Progress Reports and the previous SAPR discussed the status of NRC staff reviews of DOE site characterization study plans. However, during this reporting period, NRC and DOE staff agreed to a document submittal reduction process which will enable the staff to marshal its limited resources in the most effective way. As a result, the NRC staff's review of DOE documents will be limited to SCP Progress Reports, iterations of the Annotated Outline for the repository license application, and DOE's total system

performance assessments. However, DOE's total system performance assessments should be integrated into Chapter 6 of the Annotated Outline. Two topical reports on faulting and seismic hazard, one topical report on burn-up credit, and one topical report on extreme erosion will also be reviewed in the near-term. All information on site characterization and licensing will be reported to the staff in either the progress reports or the Annotated Outlines. The staff, therefore, is no longer formally reviewing and commenting on study plans.

The previous SAPR noted that the NRC staff, in an August 22, 1994, letter, to DOE, had documented several concerns with DOE's topical report entitled "Evaluation of the Potentially Adverse Condition 'Evidence of Extreme Erosion during the Quaternary Period' at Yucca Mountain, Nevada" and would be meeting to discuss them. As noted earlier in this SAPR, on October 7, 1994, NRC and DOE staff met to discuss these concerns and DOE's resolution so that DOE could revise the topical report and resubmit it to NRC. Although DOE representatives noted that the information and suggestions offered by NRC staff would be useful in responding to the staff's concerns, they indicated that further discussion with the staff on this topic was needed before they could respond to NRC's August 22, 1994, letter. Consequently, on January 13, 1995, NRC and DOE staff held a conference call, with the State of Nevada and Nye County, Nevada, participating, wherein the NRC staff gave a preliminary assessment of DOE's draft summary responses to NRC's comments on the topical report. DOE responded partially to the NRC comments by letter dated April 13, 1995, with additional data expected to be submitted in September 1995. A detailed review of DOE's response is still in progress. However, a preliminary review indicates that DOE has been responsive to the NRC staff's concerns.

During this same October 7, 1994, meeting, DOE also discussed its work on another topical report entitled "Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain." As noted in the previous SAPR, the NRC staff had conducted an acceptance review of the report in accordance with its Topical Report Review Plan and found the report was incomplete in several important respects and did not consider the report acceptable for further detailed review. During this meeting, the NRC staff discussed its concerns so that DOE could revise the topical report and resubmit it to NRC. Additional NRC/DOE interactions on both of these two topical reports are anticipated before DOE provides its final response to NRC comments.

On-Site Representatives:

During the reporting period, two new ORs (one responsible for QA and engineering, and one responsible for geosciences) were selected. The new ORs have been working out of NRC's Las Vegas, Nevada, office on a full-time basis since January 1995.

The ORs continued to observe DOE's site characterization activities including: (1) tunnel boring and in-situ testing in the ESF; and (2) surface-based testing in the vicinity of Yucca Mountain. During this reporting period, tunnel boring and geologic mapping advanced over 500 meters (1640 feet) down

the North Ramp of the ESF. In the course of this operation, the TBM tunnelled through a series of stratigraphic units in the Paintbrush Tuff and intersected the Bow Ridge Fault. Radial borehole testing in Alcove 1 of the ESF continued to investigate the vertical and lateral movement of gas, water, and vapor in the rock-mass. In April 1995, excavation of Alcove 2 was initiated to investigate the hydrologic and hydrochemistry properties of the Bow Ridge Fault. Using the drill and blast technique, Alcove 2 is being excavated in parallel with excavation of the main tunnel.

The ORs also observed a wide variety of surface-based field activities including: geologic mapping; borehole drilling, coring and logging; and work on the large block at Fran Ridge. In drilling borehole SD-7, located on the southeast side of the proposed repository area, a perched water body was encountered near the base of the Calico Hills Tuff about 121 to 152 meters (400 to 500 feet) above the regional water table. Water samples were collected for the U.S. Geological Survey, Los Alamos National Laboratory, the State of Nevada, and Nye County, Nevada. Hydrologic tests will be conducted on these water samples to determine the extent and age of the perched water body. Other boreholes continued to be drilled and instrumented to monitor the saturated and unsaturated zones.

2. EARLY IMPLEMENTATION OF A QA PROGRAM

During this reporting period, the NRC staff, supported by CNWRA staff, observed four DOE external audits of the M&O and one DOE external audit of Lawrence Livermore National Laboratory. Although the results of these audits generally showed satisfactory implementation of the overall QA program, the M&O program needed to demonstrate improvement in the areas of design control, corrective actions, and records. No deficiencies were identified, during the audits, that would preclude the auditing/audited organizations from continuing their quality-affecting activities.

On October 12, 1994, NRC and DOE held a periodic QA meeting to discuss issues of mutual interest related to the QA program for the DOE HLW repository. Representatives of the State of Nevada; NWTRB; Office of Civilian Radioactive Waste Management's Management and Operating Contractor; the DOE Office of Civilian Radioactive Waste Management's (OCRWM's) QA Technical Support Services Contractor; Reynolds Electrical & Engineering Company; Los Alamos National Laboratory; Lawrence Livermore National Laboratory; Weston; and Idaho National Engineering Laboratory attended the meeting. Topics discussed included: (1) the status of the DOE/Nye County cooperative drilling program; (2) the status of implementing DOE's revised QA Requirements Document; (3) the M&O Exploratory Shaft Facility Subsurface Design Package for preparation of the North Ramp; (4) DOE's triennial audit program and its proposal to use software and computer codes that have been used successfully in NRC licensing or certification processes for 10 CFR Parts 71 and 72 applications; (5) the status of NRC QA open items; (6) NRC's observations of recent DOE Yucca Mountain Quality Assurance Division audits; and (7) the status of NRC's reviews of DOE QA program changes. The NRC staff presented a status of the NRC QA open items. In particular, three open items resulting from previous observation audits were closed. For the first time since NRC QA open items were presented at these meetings, all NRC QA open items were closed. NRC

staff further summarized the results of NRC observations of five DOE QA audits. In general, NRC staff found the DOE QA audits to be useful and effective. Problems identified were relatively minor, and DOE's corrective actions were appropriate. NRC staff also presented preliminary results of its ongoing review of documents which define compliance with the Quality Assurance Requirements Document (QARD) for the organizations involved in site characterization activities at the Yucca Mountain site. The NRC staff had reviewed four organizations as of this meeting. The principal comment of NRC staff was that it wanted to see a clear and full commitment to comply with the QARD in each signed and dated policy statement. During this meeting, the State of Nevada raised concerns regarding timeliness of NRC's response to a letter dated August 15, 1994. The NRC's response to this and another letter from the State of Nevada are discussed later in this SAPR.

On January 18, 1995, NRC and DOE held another in the series of periodic QA meetings to discuss issues of mutual interest related to the QA program for the DOE HLW repository. The meeting was videoconferenced at DOE offices in Washington, D.C., and Las Vegas, Nevada. In addition to NRC and DOE staff, attendees in Las Vegas represented OCRWM's QA Technical Support Services Contractor (QATSS), Reynolds Electrical & Engineering Company, and Los Alamos National Laboratory. Attendees in Washington represented the DOE M&O, Weston, and QATSS. Topics discussed included: (1) the status of the DOE/Nye County cooperative drilling program; (2) DOE's FY 1995 audit and surveillance schedule; (3) DOE's QA overview of Site Characterization Field Activities; (4) proposed changes in DOE's QA program; (5) the status of implementing DOE's revised QA Requirements Document; (6) the M&O ESF Subsurface Design Package for preparation of the North Ramp and related Corrective Action Requests; (7) status of NRC QA open items; (8) NRC's observations of recent DOE Yucca Mountain Quality Assurance Division audits; and (9) the status of NRC's planning for an April 1995 in-field verification of Yucca Mountain site activities. Concerning the status of NRC open items, the NRC staff raised concerns about validation procedures for computer software program: as indicated in NRC QA Report 94-07, issued December 19, 1994. DOE deferred its response to NRC concerns to a later date. NRC staff also provided a summary report of its observation of four DOE QA audits. NRC staff agreed with the preliminary DOE audit team findings in each of the four audits and noted that audit team leaders were becoming more proficient. NRC staff also noted that it agreed with the preliminary audit finding that the M&O design controls were ineffective and that overall implementation of the M&O QA program was marginal. During this meeting, NRC staff discussed its proposed in-field verification. The NRC and DOE staff agreed to conduct this in-field verification in April 1995. This in-field verification is discussed elsewhere in this SAPR.

The previous SAPR discussed the NRC staff's concerns that the M&O has not been implementing its QA program for design and design control of the ESF in an effective manner. These concerns were documented in NRC letters to DOE dated August 20, 1993, and October 13, 1994. Corrective actions taken by DOE and its M&O in response to the first letter did not satisfy the NRC staff's concerns. In response to the second letter, by letter dated November 15, 1994, both DOE and the M&O agreed to take further actions to correct the problems and to prevent their recurrence. A six-point management

plan was developed by the M&O to initiate measures for appropriate corrective actions. NRC staff, in a letter to DOE dated March 9, 1995, indicated that the DOE's M&O commitments of November 15, 1994, appeared acceptable. NRC staff then conducted an in-field verification of the M&O on April 3-6, 1995, to determine whether the corrective actions committed to were being accomplished acceptably. By letter of June 16, 1995, the NRC staff transmitted its report of the in-field verification to DOE. This report provided three recommendations and commended the M&O for initiating a "Design Guidelines" document that appeared to be a good addition to the M&O design process. The staff concluded that, within the scope of the in-field verification, M&O compliance with commitments is satisfactory. Additional follow-up actions are planned for the late FY 1995-early FY 1996 time frame, depending on the receipt of documentation from DOE.

During this reporting period, NRC staff responded to two letters received from the State of Nevada regarding QA. The first, dated August 15, 1994, questioned the effectiveness of the DOE's M&O corrective actions regarding the ESF design process. In response, by letter dated November 17, 1994, the NRC staff indicated that staff concerns had to be resolved before beginning ESF construction work that might cause irreparable adverse effects on waste isolation or site characterization. The second letter from the State, dated February 10, 1995, questioned the scheduling of the NRC's in-field verification discussed above. In response, by letter dated March 13, 1995, the NRC staff indicated that, although the NRC's in-field verification had been delayed, it would take place in early April 1995. As discussed in the paragraph above, the in-field verification took place on April 3-6, 1995.

3. PERFORMANCE ASSESSMENT

During this reporting period, the final documentation of the results of the staff's second iterative performance assessment (IPA) was prepared for publication as NUREG-1464, "NRC Iterative Performance Assessment Phase 2: Development of Capabilities for Review of a Performance Assessment for a High-Level Waste Repository." Publication is expected during summer 1995.

On January 30, 1995, EPA published, for public comment in the Federal Register, proposed criteria for the certification and determination of the Waste Isolation Pilot Plant's compliance with environmental standards for the management and disposal of spent nuclear fuel (SNF), HLW, and transuranic waste (TRU) (40 CFR Part 194). These criteria represent EPA's first effort to implement its environmental standards for the disposal of SNF, HLW, and TRU (40 CFR Part 191). The comment period closed on May 1, 1995. EPA plans to reopen the public comment period in the summer 1995, after it receives the second part of the DOE draft compliance certification application. The NRC staff intends to provide, following Commission review, comments on the proposed certification criteria to EPA. Also on February 14-16, 1995, as part of the rulemaking process, the staff participated in an EPA-sponsored workshop, in Washington D.C., on the proposed certification criteria, which focused on the treatment of old data, climate, and institutional controls in performance assessments.

Since the late 1980s, the NRC staff has been studying the use and elicitation of expert judgment for the HLW repository. With the assistance of the CNWRA, NRC staff is developing regulatory guidance on the use of formal expert elicitation. Building on the technical basis established in NUREG/CR-5411, "Elicitation and Use of Expert Judgment in Performance Assessment for High-Level Radioactive Waste Repositories," and on the experience gained in conducting an expert elicitation on future climate at Yucca Mountain (IPA Phase 2.5), the staff will develop regulatory guidance in two phases. The first phase will consist of a draft staff technical position (STP) which will make explicit NRC's views on the attributes of an appropriate process for formal elicitation of expert opinion. The draft STP will be published for comment in fall 1995 and is anticipated to present a protocol for formal expert elicitation accompanied by a description of the general conditions that may warrant the use of a formal elicitation process. Comments and concerns that emerge during the development and review of the draft STP will be evaluated, along with the need for additional guidance, and a final STP will be issued in spring 1996. If warranted, the staff will, as a second phase, proceed to develop guidance that will address specific applications of formally-elicited judgments.

During the development of the draft STP, NRC staff observed the first two of four workshops sponsored by DOE for the Probabilistic Volcanic Hazard Analysis Project. These workshops, held February 22-23, 1995, and March 30-31, 1995, in Phoenix, Arizona, and Las Vegas, Nevada, respectively, were conducted as a part of DOE's program to elicit judgments from an expert panel with regard to the probability of future volcanic disruption of a repository at Yucca Mountain. Preliminary concerns expressed by NRC staff relate to the potential for bias in the selection of experts and in the distribution of background documentation. These concerns have also been raised to DOE's attention at NRC/DOE bi-monthly management meetings. The staff will continue to follow selected instances of DOE's use of expert elicitation throughout the development of regulatory guidance on this subject.

Also during this reporting period, the staff participated in a number of meetings on performance assessment-related issues. On December 12-13, 1994, the staff participated with DOE and the National Academy of Sciences (NAS) in an Electric Power Research Institute (EPRI)-sponsored meeting to discuss improvements to flow and transport models used in Yucca Mountain performance assessments. On January 10-11, 1995, staff attended an NWTRB meeting that focused on DOE's Waste Isolation Strategy. As noted earlier in this SAPR, on January 17, 1995, NRC and DOE staff held a meeting to discuss DOE's IDS and the evolution of the performance allocation process first described in the 1988 SCP. On February 22-23, 1995, the DOE staff participated in a second EPRI-sponsored meeting to discuss improvements to source-term models used in Yucca Mountain performance assessments.

Finally, the NRC staff continues to await the report of the NAS Committee on the Technical Basis for Yucca Mountain Standards. The NRC staff will review the recommendations of this committee to assess their impact on EPA development of final environmental standards for the proposed repository at Yucca Mountain.

4. EARLY RESOLUTION OF STATE AND TRIBAL CONCERNS

The NRC staff continued its efforts to maintain its openness with those parties affected under the Nuclear Waste Policy Act of 1982, as Amended. On October 4-6, 1994, NRC staff attended a National Congress of American Indians (NCAI) meeting in San Diego, California, hosted by the National Indian Nuclear Waste Policy Committee (NINWPC). Also in attendance were members of the NINWPC and representatives of DOE. As more tribal governments become aware of the ramifications of DOE programs, they are seeking greater participation in the HLW disposal and cleanup processes. Presentations were given by various DOE staff members regarding monitored retrievable storage, transportation, stakeholder involvement, and other tribal concerns. NRC presented an overview of the NRC's HLW program.

On February 2, 1995, NRC staff met with American Indian representatives in Las Vegas, Nevada. The purpose of this meeting was to discuss ideas for improving communication between NRC and Indian tribes in the area of nuclear waste management. This meeting was an outgrowth of a meeting last year between tribal leaders and the Commission. In this meeting, several ideas were discussed for improving communication. As a result of this meeting, staff researched the use of videoconferencing and the possibility of providing computer capabilities to the Indian tribes. The use of videoconferencing equipment would be beneficial to the Indian tribes and other interested parties located near Yucca Mountain. By having videoconferencing available, meetings taking place in the Washington, D.C. area could be viewed and participated in from Nevada. This would allow local governments and tribal representatives to participate more actively and would reduce the need for travel funds, which are already in short supply for most of these parties.

In addition, the NRC staff made notable progress towards providing surplus computer equipment to the Indian tribes to allow for on-line communication through Internet or other means of electronic communication. Computer equipment has been made available, but the staff is awaiting a final decision from NCAI as to which tribes should receive this equipment.

5. RULEMAKING AND REGULATORY GUIDANCE DEVELOPMENT

During this reporting period, the NAS Committee on Technical Bases for Yucca Mountain Standards completed its public deliberations and continued to analyze issues related to its charge to advise EPA on the technical bases for a reasonable standard for the protection of the public health and safety. Pursuant to the Energy Policy Act of 1992, NAS is to make recommendations regarding a standard that will apply to radioactive material that is stored or disposed of at a proposed repository at Yucca Mountain. NRC was represented at all of the open meetings held by the Committee. Memoranda summarizing the technical and policy content of all open meetings of the Committee have been provided to the Commission. The Committee is expected to issue formal, peer-reviewed recommendations in summer 1995.

In October 1994, NUREG-1323, "License Application Review Plan (LARP) Revision 0" was published and distributed to DOE and other parties for their information. As noted in the previous SAPR, the LARP is intended to provide

guidance to the NRC staff, who will review DOE's license application to construct a mined geologic repository for the disposal of spent nuclear fuel and other HLW at Yucca Mountain, Nevada, and to ensure the quality and uniformity of the staff reviews. Because it is a public document, the LARP will also help DOE and other interested parties better understand the NRC staff's review process by describing the review strategies, procedures, and acceptance criteria that the staff will use. LARP Revision 0 represents the staff's initial efforts in developing the LARP. The staff currently plans on issuing a revision to the LARP each year, culminating with the issuance of the final LARP in 2001. Each revision of the draft LARP will contain the work completed by the staff during that particular year and will not necessarily be a complete rewrite of the entire LARP. Revision 0 and subsequent revisions of the draft LARP are preliminary documents and subject to change.

During this reporting period, the staff completed its work on a final Part 60 rulemaking entitled, "Clarification of Assessment Requirements for the Siting Criteria and Performance Objectives." The rule was submitted to the Commission and is currently under review.

As noted earlier, in the "Performance Assessment" section of this SAPR, on January 30, 1995, EPA published, for public comment, proposed "Criteria for the Certification of the Waste Isolation Pilot Plant's Compliance with Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Wastes (40 CFR Part 194)." The NRC staff provided informal comments on a working draft of the compliance criteria in February 1994, and intends to provide, after Commission review, formal comments on the proposed rule.

As noted in the previous SAPR, on September 13, 1994, the NRC staff submitted a revised notation vote paper to the Commission (SECY-94-239, "Proposed Amendments to Part 60 on Disposal of High-Level Radioactive Wastes in Geologic Repositories--Design Basis Events for the Geologic Repository Operations Area"). The purpose of the paper was to obtain the Commission's approval for publication, in the Federal Register, of: (1) proposed amendments to Part 60 that would clarify the requirements necessary to protect public health and safety for a broad range of normal and accident conditions during the operational period of a geologic repository; and (2) a notice that would grant in part, and deny in part, a DOE petition for rulemaking on the same subject. During this reporting period, the Commission issued a staff requirements memorandum (SRM) approving the publication of a partial grant and partial denial of the petition, and approving publication of the proposed rule subject to incorporation of the comments included in the SRM. The staff revised the proposed rule to reflect the Commission's comments, and both the proposed rule and the notification of partial grant and partial denial of the petition were published in the Federal Register on March 22, 1995.

6. MONITORED RETRIEVABLE STORAGE

As noted in the previous SAPR, the Mescalero Apache Tribe is proceeding with a private initiative to site an away-from-reactor independent spent fuel storage installation (ISFSI) on its reservation in New Mexico. The tribe previously entered into an agreement with Northern States Power, with 33 utilities and

other industry groups joining in the development of a business arrangement. On January 31, 1995, the tribal members voted to reject the project, but a petition signed by 703 members prompted the tribal council to call another vote. On March 9, 1995, the members voted 593 to 372 in favor of the project. NRC has received no formal submittal from any potential licensee on this issue.

7. SPENT FUEL STORAGE AND TRANSPORTATION SYSTEM COMPATIBILITY

DOE continued to move forward with its plan to develop an MPC system of containers for storage, transport and disposal of spent nuclear fuel. The system would consist of canisters that are loaded and permanently sealed at the reactor facility, and then placed in different casks for storage or transport, and ultimately transferred to a special overpack for disposal. DOE is planning on four basic canister designs: two are large canisters (one containing 21 pressurized-water reactor (PWR) fuel assemblies, and one containing 40 boiling-water reactor (BWR) fuel assemblies), which fit into a 125-ton cask, and two are small canisters (12 PWR assemblies and 24 BWR assemblies), which fit into a 75-ton cask. Depending on the number of vendors receiving contracts, DOE may submit up to 12 storage and transport applications in mid-1996 for certification of an MPC. DOE is currently reviewing vendor proposals. To date, DOE has awarded one contract to Westinghouse Electric Corporation of Pittsburgh, Pennsylvania, and additional contracts are expected to be awarded within the next few months.

During this reporting period, an NRC staff task force was organized to review and analyze issues associated with burnup credit in the criticality analysis for spent fuel casks, and in particular, the MPC. On February 9, 1995, the task force, accompanied by DOE staff, visited Sandia National Laboratories to tour the facilities for DOE's burnup credit experiments. DOE is currently planning to prepare three topical reports concerning burnup credit. The first report will consider partial burnup credit for PWR fuel for storage and transport and is expected to be submitted in May 1995. The second report will discuss full burnup credit for PWR fuel for storage and transport. The target date for this report is September 1996. The third topical report, scheduled for 1998, will discuss burnup credit for disposal of PWR and BWR spent fuel.

As mentioned previously in this report, on January 20, 1995, a management meeting was held between NRC and DOE staff to discuss DOE's proposed schedule for the MPC, particularly in relation to certification for storage and transport. During the meeting, NRC staff stressed that submittal of a quality application is critical to a smooth review process. By letter dated February 27, 1995, NRC staff provided DOE with a schedule, that, although not completely in line with DOE's proposed schedule, it believes to be more realistic and feasible. The letter noted that various legislative proposals being introduced and discussed in the current U.S. Congress may significantly affect any currently contemplated schedule.

In addition to work on the MPC, past Quarterly Progress Reports and the previous SAPR noted that the Sacramento Municipal Utility District has selected the standardized NUHOMS-24P spent fuel storage design as part of a DOE cooperative program to demonstrate the licensing of a dual-purpose storage

and transport system for its Rancho Seco ISFSI. The design consists of a canister housing spent fuel assemblies, that is placed in the NUHOMS-MP187 transportation cask for transport and in Standardized NUHOMS-24P Horizontal Storage Modules for storage. The NRC staff is currently reviewing the vendor's February 28, 1995, response to the staff's first round of questions on the transportation application. The first round of questions on the storage license application were transmitted to the vendor in November 1994.

8. TRANSPORTATION

The NRC staff has been reviewing the Safety Analysis Reports (SARs) submitted by General Atomics, on behalf of DOE, in July, 1994, for the GA-4 and GA-9 legal-weight truck spent fuel transportation casks. The GA-9 is designed to carry up to nine BWR spent fuel assemblies whereas the GA-4 is designed for up to four PWR spent fuel assemblies. By letter of May 22, 1995, the NRC staff transmitted questions about the SARs to DOE. These questions will be discussed at a future NRC/DOE meeting.

9. RESEARCH

During this reporting period, two new projects began at CNWRA and one ended. The project, "Subregional Hydrogeologic Flow and Transport Processes," began in October 1994. Its objective is to develop alternative conceptual models of flow, transport, and infiltration around Yucca Mountain, using currently available data. The project will terminate at the end of FY 1998. Another project, "High-Level Waste Near-Field Processes and Variations," also began in October 1994. Its objective is to develop and test hypotheses for the range of coupled thermal, hydrological, and chemical processes among natural and engineered components in the neighborhood of emplaced heat-generating HLW at Yucca Mountain. This project also will terminate at the end of FY 1998. The CNWRA "Thermohydrology Research Project" finished its technical work in December 1994. The objective of the project was to use similitude-based laboratory experiments and mathematical modeling studies to understand how the heat from emplaced HLW would redistribute liquid water in unsaturated porous media. The CNWRA investigators developed a dimensionless advection number to characterize various regimes of the redistribution process. The draft final report, "Thermally Driven Moisture Redistribution in Partially Saturated Porous Media," CNWRA 95-005, was issued in January 1995 and was reviewed by the NRC Project Officer and external peer reviewers. CNWRA is currently revising the report in response to the reviewers' comments and will issue it as a NUREG/CR in June 1995.

In October 1994, two CNWRA research projects were reviewed by external peer reviewers. The first of these, "Volcanic Systems of the Basin and Range," is examining volcanic data from the Basin and Range geologic province to estimate the probability of occurrence of future volcanoes at the Yucca Mountain site. The second project, "Field Volcanism," is examining active volcanic analogues of old volcanoes that have occurred near Yucca Mountain to estimate consequences of volcanism. The reviewers were briefed on the projects at the CNWRA and visited sites of past volcanism near Yucca Mountain. The reviewers' comments and CNWRA's planned responses to them were provided in "Expert-Panel Review of CNWRA Volcanism Research Programs," CNWRA 95-002, issued in revised

form in March 1995.

The peer review of CNWRA's volcanism research stimulated interest by contractors to DOE who are investigating volcanism at Yucca Mountain. At DOE's invitation, one of the CNWRA investigators gave a presentation at a February 22 and 23, 1995, Workshop on Probabilistic Volcanic Hazard Analysis held in Phoenix, Arizona. In a January 24, 1995, letter, DOE contractors investigating volcanism at Yucca Mountain invited the peer reviewers of CNWRA's volcanism research to a field trip to Yucca Mountain. Two of the reviewers went to the Phoenix workshop and a subsequent field trip to volcanic sites at Yucca Mountain. During this reporting period, CNWRA submitted a paper on probabilistic volcanic hazard analysis to the Journal of Geophysical Research. The paper was reviewed by a DOE investigator who recommended rejecting the paper. After some deliberation, a decision was made to publish the CNWRA paper in the journal and the DOE investigator's comments on the paper may appear in the same issue of the journal, as a letter to the editor.

In January 1995, CNWRA and the University of [redacted] hosted a biannual workshop, now called the "Evans Conference" in honor of its founder, in Phoenix, Arizona, on flow and transport in unsaturated fractured media. The theme of the conference was the measurement of flow and transport parameters in and water infiltration into unsaturated fractured rocks. Staff and contractors representing NRC, DOE, and the State of Nevada participated in the workshop. The workshop participants presented current results of their efforts to understand flow and transport in unsaturated media at Yucca Mountain and in unsaturated formations. The workshop participants also visited the NRC-sponsored research facility at the Apache Leap Tuff Site near Superior, Arizona.

On March 27 and 28, 1995, NRC and CNWRA hosted a workshop at NRC Headquarters on DECOVALEX, an international cooperative effort to evaluate and test mathematical models of coupled thermal, hydrological, and mechanical interactions near emplaced HLW. Participants from NRC, DOE, the United Kingdom, France, Japan, Sweden, and Canada participated. Results of the DECOVALEX effort will be published by Elsevier Science Publishing Co., Inc., in the book "DECOVALEX - Mathematical Models and Experimental Studies of Coupled Thermo-Hydro-Mechanical Processes in Fractured Media." CNWRA will publish "Chapter 7 - Distinct Element Models for the Coupled T-H-M Processes: Theory and Implementation," "Chapter 15 - Coupled Mechanical Shear and Hydraulic Flow Behavior of Natural Rock Joints," and "Chapter 18 - Experimental Study on Dynamic Behavior of Rock Joints" in the book.

10. NUCLEAR WASTE NEGOTIATOR

During this reporting period, the Office of the Nuclear Waste Negotiator was abolished and there were no interactions to report.

11. LSS

There was a significant redirection of the NRC staff's work on the LSS during this reporting period, beginning with the March 13, 1995, release of an audit report by the NRC's Office of the Inspector General (OIG). This audit report

noted that the LSS program had been stalled in the past 5 years primarily due to delays in the DOE license application schedule, personnel changes in DOE and NRC, changes in program direction, and lack of agreement over funding. With only 6 years remaining until DOE's license application is submitted, OIG found that NRC needs to provide strong leadership and direction to help resolve several long-standing inter-agency issues and to prevent unnecessary delays and ensure that the LSS is ready when it is needed. The OIG recommended that NRC obtain a formal commitment from DOE in the form of a Memorandum of Understanding (MOU) on key aspects of the LSS, and, if no agreement can be reached or if DOE cannot meet its obligations, the LSS Administrator (LSSA) should develop a contingency plan for developing the LSS. In response to this finding, the NRC chartered the LSS Senior Management Team (SMT).

During this reporting period, the SMT briefed the Commission on the need for the LSS and began work with DOE in developing a MOU that will clarify agency roles in the development, operation and maintenance of the LSS, and resolve the funding issue. On May 12, 1995, DOE also briefed the Commission on the status of the LSS. This briefing highlighted DOE's support for the LSS, the DOE schedule for developing the LSS, and DOE's budget for the LSS. DOE also noted its work with NRC staff to develop the aforementioned MOU.

There were also two meetings of the Licensing Support System Advisory Review Panel (LSSARP) during this reporting period. The LSSARP is comprised of representatives of NRC; DOE; the State of Nevada; affected units of local government; the National Congress of American Indians; and an industry coalition. The first meeting was held on December 12-13, 1995, in Las Vegas, Nevada. DOE reported that an internal working group was developing an implementation strategy that would be consistent with the DOE Program Approach. The working group was tasked with reviewing LSS development history, commitments and expectations, statutory requirements, implementation options, life-cycle costs, and expected data volumes. DOE reported that it had a system development schedule that would result in turnover of the LSS to the LSSA for operation sometime in mid-1999, allowing the LSSA about nine months to load the data. DOE stated that a report of the working group would be released by mid-January 1995.

Also during the December 1994 meeting, NRC briefed the LSSARP on the status of its work on the final Regulatory Guide DG-3009, "Topical Guidelines for the Licensing Support System." Comments from the 1993 release of the draft version of this regulatory guide are being incorporated for the final draft. This version will include documents relevant to environmental issues, including socioeconomic and transportation issues, and will specifically identify the National Energy Policy Act. NRC also presented an overview of the LSS Participant Compliance Certification Program, and, presented the LSS Participant Commitments document. The purpose of the presentation was to give the LSSARP members an overview of the document, which describes the LSSA's view of the obligations of all participants to the licensing proceeding. Participants were asked for their comments prior to the next meeting.

A second LSSARP meeting was held on March 22-23, 1995, in Las Vegas, Nevada. During this meeting, NRC presented its revisions of the Draft LSS Participant

Commitments document based on the comments received from Clark and Nye Counties, Nevada, and DOE. Another round of reviews was solicited from the participants. NRC also reported that the Topical Guidelines were still in draft. Representatives of the NRC's OIG presented the findings of their audit of NRC's portion of the LSS.

DOE presented the status of its current LSS activities. A MOU was determined to be essential, although it was recognized that it was not the mechanism that would effect the transfer of money from one agency to another. DOE is contemplating a direct payment mechanism reflected through an appropriations bill, spelling out that DOE will transfer funds to NRC. DOE has drafted a decision memorandum, and is ready to move forward to get approval to proceed with the direct payment mechanism, which can be made to NRC as soon as an appropriation is made by Congress.

DOE reported on how its working group has developed a draft LSS Phase I functional requirements document. It was distributed, and plans were made for members of the LSSARP Technical Working Group to meet and review the Phase I requirements before the next LSSARP meeting.

DOE discussed potential issues with 10 CFR Part 2 rule for use of the LSS that could impact the implementation of the LSS. There was similar discussion about the need for changes to the rule to remove technologically constraining language. Guidance was provided to them by the members of the LSSARP, and a decision was made to craft a "sense of the group" memorandum telling DOE not to feel constrained by "old technology" verbiage in developing its designs. Other topics discussed at this meeting included the need to designate a site for the LSS, header fields, inclusion/exclusion criteria, and a pilot project.

CONCLUSIONS:

NRC and DOE staff continued to make progress in addressing and resolving issues at the staff level. The NRC staff believes that intended improvements in program integration through implementation of the Program Approach will be beneficial; however, the NRC staff has some concerns regarding implementation of DOE's Program Approach. In addition, the NRC staff is continuing to monitor DOE's implementation of a corrective action plan for the DOE M&O's QA program. The NRC staff has brought its concerns to DOE's attention in numerous interactions and transmittals and has plans for verifying DOE actions toward resolving these concerns.

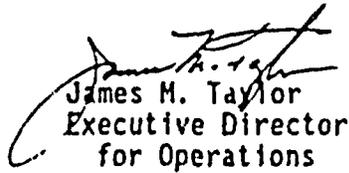
During this reporting period, videoconferencing was used for several NRC/DOE interactions, with very favorable results. Videoconferencing is anticipated to play a significant role in improving the quality of NRC/DOE interactions and to further opening these interactions to affected parties in the HLW program.

Ever since the NRC staff completed its first Quarterly Progress Report on DOE's civilian HLW management program (SECY-87-137), the intent of these quarterly (and more recently, semi-annual) progress reports has been to document, for the Commission, the overall NRC staff perspective on the progress of the repository program. However, the staff briefs the Commission

regularly on the overall HLW program, provides appropriate notification of specific items of interest, and conducts briefings on appropriate technical topics to keep the Commission informed of important issues and interactions. Also, DOE briefs the Commission on the HLW program on a semi-annual basis. In order to more effectively use its resources for the HLW program, the NRC staff recommended terminating its production of the SAPR, as of this paper. By staff requirements memorandum, COMSECY-95-017, "Periodic Reports/Meetings Required by the Commission," the Commission approved the NRC staff's recommendation. Therefore, this will be the last SAPR.

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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