



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, DC 20555 - 0001

ACNWS-0145

June 22, 2004

The Honorable Nils J. Diaz  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT: SUMMARY REPORT—150<sup>TH</sup> MEETING OF THE ADVISORY COMMITTEE  
ON NUCLEAR WASTE, MAY 25–27, 2004, AND OTHER RELATED  
COMMITTEE ACTIVITIES

Dear Chairman Diaz:

During its 150<sup>th</sup> meeting on May 25–27, 2004, the Advisory Committee on Nuclear Waste (ACNW) discussed several matters and completed the following reports to Nils J. Diaz, Chairman, U.S. Nuclear Regulatory Commission (NRC):

**REPORTS**

- Comments on the Activities of the Office of Nuclear Material Safety and Safeguards Task Group on Risk-Informed Regulation, dated June 9, 2004
- Decommissioning the West Valley Site and the Application of Performance Assessment to Demonstrate Compliance With the License Termination Rule, dated June 9, 2004.<sup>1</sup>

**HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE**

**1. Safeguards and Security Matters [CLOSED]**

The Committee heard presentations by and held discussions with representatives of the Office of Nuclear Materials Safety and Safeguards (NMSS) to discuss safeguards and security matters.

**2. Louisiana Energy Services (LES) Gas Centrifuge Uranium Enrichment Project**

Mr. Timothy Johnson, Project Manager, NMSS, discussed the Louisiana Energy Services (LES) license application to construct a plant in Eunice, New Mexico, to enrich uranium using a gas centrifuge process. He discussed the key characteristics of the facility and

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<sup>1</sup>The ACNW does not expect a response from the Executive Director for Operations to this report.

the unique regulatory requirements for uranium enrichment plants, as well as NRC plans for completion of the technical review and environmental impact statement (EIS).

He noted that three petitions to intervene have been submitted: one from the New Mexico Environment Department, one from the New Mexico Attorney General, and a combined Nuclear Information and Resource Service/Public Citizen petition. The petitions made contentions about ground water quality, water usage, disposition of depleted uranium (DU), the viability of LES, decommissioning funding, adequacy of radiation protection program, gas line accidents, nonproliferation, and security. The staff has initiated a review of the application and issued a request for additional information to LES on April 19, 2004.

After a discussion on the integrated safety analysis (ISA) approach, Ms. Melanie Wong described the environmental review process and the 14 areas of environmental considerations. Mr. Timothy Harris then provided an overview of the depleted uranium disposition issue, indicating that of the six alternative strategies LES identified for dispositioning the DU, two are considered the most plausible: private sector conversion and disposal in an exhausted mine, and U.S. Department of Energy (DOE) conversion and disposal.

### **Conclusions/Action Items**

The Committee stated its intention to follow the licensing activities as they develop, particularly those related to the evolution of the ISA with respect to the agency's risk-informed approach to safety analyses.

### **3. Review of DOE Technical Basis Documents Supporting the Yucca Mountain License Application (YMLA)**

Early in the NRC/DOE pre-licensing consultation process (i.e., late 1980s), the NRC staff identified implementation issues with respect to DOE's Yucca Mountain quality assurance (QA) programs. DOE audits, as well as NRC independent audits, have subsequently shown that the DOE has had mixed success in improving the QA pedigree of its technical programs.

In anticipation of a forthcoming DOE license application (LA) in late 2004 and lingering staff concerns regarding the effectiveness of past DOE corrective QA actions, the NRC decided to independently evaluate certain DOE technical documents and supporting activities integral to a Yucca Mountain LA. Mr. Thomas Matula, a Senior Project Manager in NRC's recently created Division of High-Level Waste Repository Safety, briefed the Committee on the results of this independent evaluation. This "independent technical evaluation" was conducted by the NRC staff and its technical assistance contractor, the Center for Nuclear Waste Regulatory Analyses, in late 2003 and early 2004. The evaluation focused on 3 of the 120 analysis model reports (AMRs) expected to be used to

support DOE's LA.<sup>2</sup> The AMR subject areas selected were considered to be of medium to high-risk significance to repository performance. Mr. Matula noted that the staff's independent technical evaluation was not unlike an independent QA audit. The technical evaluation focused on the process for developing and controlling the AMRs and the effectiveness of past and recent corrective actions in the areas of model development, software development, and data acquisition.

At the end of each technical evaluation, DOE was briefed on the results of the audit team's findings. As a result of these AMR technical evaluations, DOE announced in early 2004 that it would bring in 140 subject matter experts from national laboratories to independently review the technical quality of all 120 AMRs. (Independently, the ACNW staff has learned that this 4-month effort is expected to cost DOE about \$11 million and be completed in the June-July 2004 timeframe.) Mr. Matula observed that the impact of this unscheduled DOE AMR "scrubdown" was to delay DOE responses to the so-called 293 key technical issue agreements by several months.

In a letter dated April 10, 2004, the NRC staff publicly released the results of its technical evaluations. This release was intended to coincide with a technical exchange meeting held with DOE on May 5, 2004. In the April 2004 letter, the NRC staff requested that the DOE respond within 30 days of the May 5, 2004, technical exchange.<sup>3</sup>

**Summary of NRC staff technical evaluation findings.** Mr. Matula noted that the team found a number of good practices during the evaluation. For example, they found that:

1. DOE staff and Bechtel-SAIC<sup>4</sup> staff support was exceptional throughout the planning and performance of the NRC evaluation.
2. Preparations, information availability, and willingness of personnel to discuss concerns, were outstanding.
3. Technical information for the AMRs was greatly improved over what was available for the Total System Performance Assessment for Site Recommendation. AMRs were generally updated and more comprehensive and contained more data.

The team identified some concerns with both the clarity of explanation of DOE's technical bases presented in the AMRs evaluated and with the presentation of adequate technical

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<sup>2</sup>"Generalized and Localized Corrosion of the Waste Package Outer Barrier," "Commercial Spent Nuclear Fuel Waste Form Degradation Model," and "Drift Degradation Analysis."

<sup>3</sup>DOE's response was subsequently transmitted to the NRC staff in a letter dated May 28, 2004.

<sup>4</sup>DOE's technical assistance contractor

information necessary to support that explanation. These concerns generally fell into two categories:

1. In some cases, DOE did not explain its technical basis well enough for NRC staff to understand how the DOE reached its conclusions. Because DOE's explanation of its technical basis was not clear, the team could not determine if the associated technical information was adequate.
2. In some cases, DOE did provide a clear explanation of its technical basis but did not provide adequate technical information to support that explanation. Technical information included experimental data, analog information, analyses, and expert judgment.

The team's overall determination that technical information was lacking was based on the information presented in the AMR and supporting references.

#### **Conclusions/Action Items**

The Committee indicated its intention to continue to follow developments in this area. DOE representatives plan to discuss the Department's response to NRC's April 10, 2004, letter at the ACNW's 151<sup>st</sup> meeting, June 2004.

#### **4. Decommissioning Program Changes**

Mr. Dan Gillen, Deputy Director, Division of Waste Management and Environmental Protection, NMSS, discussed the changes to the NRC's decommissioning program as described in SECY-04-0022. He described the changes in the scope of the decommissioning program, the regulatory framework, and the decommissioning process.

Mr. Gillen provided a historical perspective of the program and scope of the program from the development of regulations and guidance through license termination.

He provided valuable insights by comparing the program in the 1990s with its current status regarding scope, regulatory framework, and the program process itself. He closed with a discussion of future program changes designed to avoid future legacy sites.

#### **Conclusions/Action Items**

The Committee indicated its intention to continue to follow the many developments in this large and changing agency program and noted that a decommissioning-related presentation is planned for each of the future ACNW meetings.

#### **5. Preparation for Meeting With the NRC Commissioners**

The ACNW is scheduled to brief the Commission in July 2004. After internal discussion between ACNW members and staff, it was agreed that the following proposed items

would be transmitted to the NRC Office of the Secretary as an outline for the subject briefing.

## 1. INTRODUCTION

## 2. ACNW PRESENTATIONS

- A. Opening Remarks
- B. Risk Insights Activities
- C. ACNW Working Group Sessions
- D. Other Committee Activities
  - NRC/CNWRA Research
  - NMSS Decommissioning Programs (viz West Valley)
- E. Closing Comments
  - Proposed Future Activities

## 6. Treatment of Uncertainties in Hydrologic Models: Conceptual Model and Parameter Uncertainty

Presentations were given to the ACNW regarding the treatment of uncertainties in hydrologic models that support performance assessments. The focus was on conceptual model and parameter uncertainty. The presenters included Thomas Nicholson from NRC's Office of Nuclear Regulatory Research, Philip Meyer from Pacific Northwest National Laboratory, and Shlomo Neuman of the University of Arizona. Hydrologic uncertainty can be addressed by considering plausible alternative conceptualizations of the groundwater system and uncertainty about future behavior. Models based on a single concept can underestimate uncertainty by undersampling valid model "space" (Type I error). Single concept models can also introduce bias by relying on an invalid model (Type II error). The resulting uncertainty or bias may be significant. The method of maximum likelihood Bayesian model averaging was suggested to provide a theoretical and working framework for prediction under uncertainty related to model structure, parameters, and forcing terms, consistent with available data.

Following the ACNW meeting, the presenters convened a 1-day workshop to describe their methods in greater detail for the NRC staff.

### Conclusions/Action Items

The briefing was provided for information purposes only. No follow-up actions are required.

## **7. Reconciliation of ACNW Comments and Recommendations**

The Committee received responses from the Executive Director for Operations for the following letters:

1. "Instability of Emplacement Drifts of the Proposed Yucca Mountain High-Level Waste Repository," dated April 16, 2004

The Committee accepted the EDO response, but noted that the use of realism in the staff's analyses of the proposed Yucca Mountain repository will be a generic and ongoing issue.

2. "Comments on Selected NRC-sponsored Technical Assistance Programs of the Center for Nuclear Waste Regulatory Analyses," dated April 16, 2004

ACNW member Ruth Weiner will review the EDO response to this letter as well as other recently provided information and propose a course of action for the Committee regarding acceptance or rejection of the April 16, 2004, EDO response.

Responses are yet to be received regarding the following three ACNW May 3, 2004, reports to Chairman Diaz:

- Risk Insights Baseline Report
- Review and Evaluation of the U.S. Nuclear Regulatory Commission's Radionuclide
- Transport Waste Safety Research Program

## **8. Proposed Agenda for the 151<sup>st</sup> ACNW Meeting**

The Committee agreed to consider the following topics at its 151<sup>st</sup> meeting on June 22–24, 2004:

- Working Group: Geosphere Transport of Radionuclides at the Proposed Yucca Mountain HLW Repository
- DOE Response to NRC Independent Evaluation of DOE Documents Supporting the Yucca Mountain License Application
- Preparation for Meeting with the NRC Commissioners
- Preparation of ACNW Reports on:
  - Decommissioning Program Changes
  - NRC Independent Evaluation of DOE Documents Supporting the YMLA
  - Geosphere Transport Working Group
  - Treatment of Uncertainties in Hydrologic Models

**9. Election of Officers**

Committee members agreed to waive the bylaws regarding the timing for the election of officers because of Chairman Garrick's inability to attend the June ACNW meeting. Subsequently, members re-elected B. John Garrick and Michael T. Ryan, to the positions of Chairman and Vice Chairman, respectively.

Sincerely,

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B. John Garrick  
Chairman