



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

ACNWS-0162

April 28, 2006

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

Dear Chairman Diaz:

SUBJECT: SUMMARY REPORT—168TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE, MARCH 22–24, 2006, AND RELATED ACTIVITIES OF THE COMMITTEE

During its 168th meeting, March 22–24, 2006, the Advisory Committee on Nuclear Waste (ACNW) discussed several matters and completed the following report.

REPORT

Report to Nils J. Diaz, Chairman, NRC, from Michael T. Ryan, Chairman, ACNW regarding review and evaluation summary of the U.S. Nuclear Regulatory Commission's (NRC's) Waste Safety and Technical Assistance Programs, dated April 14, 2006

HIGHLIGHTS OF KEY ISSUES

1. ACNW Working Group Meeting on Draft Final Guidance To Implement NRC's License Termination Rule

In September 2003, the NRC staff published a three-volume report entitled, "Consolidated NMSS Decommissioning Guidance." This three-volume report (designated NUREG-1757) provides guidance primarily on planning and implementing license termination under NRC's License Termination Rule (LTR) found at Subpart E of 10 CFR Part 20. In September 2005, the NRC staff issued Draft Supplement 1 to NUREG-1757, the first update to the NUREG series, for public comment. The supplement reflects current NRC decommissioning policy and provides draft guidance for addressing the following LTR analysis issues, which were previously explored by the NRC staff in a series of Commission papers: restricted use and institutional controls; onsite disposal of radioactive materials; scenario justification based on reasonably foreseeable land use; intentional mixing of contaminated soil; and removal of material after license termination.

At its 168th meeting, the NRC staff briefed the Committee and a panel of invited subject matter experts on the public comments received on Draft Supplement 1. The staff said it had received approximately 12 sets of comments on its proposed guidance. During the working group meeting, the staff described how it generally intended to respond to the public comments. Overall, the staff said the proposed guidance was well-received, and few modifications to the guidance are currently expected as a result of the public comment process.

Committee Action

The NMSS staff intends to finalize Supplement 1 to NUREG-1757 later this fiscal year. The Committee intends to provide the Commission with comments on Supplement 1 before the guidance is finalized.

2. U.S. Department of Energy Office of Science and Technology and International Waste Safety-Related Research

Representatives of the U.S. Department of Energy (DOE) Office of Science and Technology and International (OST&I) briefed the Committee on waste-safety related work sponsored by OST&I. The OST&I reports to the Office of the Chief Scientist in DOE's Office of Civilian Radioactive Waste Management (OCRWM). The OST&I was established in April 2002 and is funded at \$21M for FY 2006. Funding areas in OST&I are source term, natural barriers, materials performance, radioactive getters, and advanced technologies. About two-thirds of the OST&I funding for FY 2006 will be in the area of advanced technologies. The projects in the advanced technologies area are (a) use of iron-based amorphous metal coatings to replace high-cost stainless steels and other metals, (b) improved package welding techniques, (c) development of more realistic seismic response analysis models, (d) use of silica-based cements in tunnel construction, (e) use of backfills, and (f) development of longer lasting tunnel boring machine cutters.

The OST&I funds work by industry, universities, and national laboratories and by the OCRWM's maintenance and operations site contractors, consistent with the organization's expertise. Work in FY 2006 will be integrated through OST&I's newly designated lead laboratory (Sandia National Laboratories).

Committee Action

This briefing was for information. The ACNW will use the insights gained in these discussions in its review of NRC research programs.

3. Briefing by the Director of the Office of Nuclear Regulatory Research

Carl Paperiello met with the ACNW to discuss matters of mutual interest and planned future interactions with the ACNW. Planned activities include discussions on the Office of Nuclear Regulatory Research's (RES's) radiation protection research program, BEIR VII and the recent French work on health effects on low-level radiation, and RES participation in the ACNW's working groups on groundwater monitoring and concrete barrier performance. RES is planning to interact with the ACNW on planned updates (associated with new reactor licensing) to a series of Divisions 1 and 8 regulatory guides and 10 CFR 20.1406.

A detailed discussion of RES's radiation projection program is planned for the ACNW's April 2006 meeting. The goals for RES's radiation protection program are to develop information gaps in important regulatory areas related to dosimetry and computer models, emerging health physics issues, and the uncertainties in selected computer code models. RES is not planning to initiate new work related to additional risk-informing of 10 CFR Part 61. Much of RES's current and past work in the area of risk-informing regulations could be applied to reevaluations of low-level waste.

RES believes that the current user need system for identifying research tasks provides RES with an adequate mechanism for independently addressing important concerns. Communication with user offices is vital and is facilitated by the issuance of topical and other RES reports.

Committee Action

The Committee will consider the insights gained in these discussions and report to the Commission as appropriate in the near future.

4. Modeling the Long-Term Fluvial Redistribution of Volcanic Tephra in Forty Mile Wash, Yucca Mountain

The Committee was briefed by the NRC staff and the Center for Nuclear Waste Regulatory Analyses about a hypothetical scenario in which a repository at Yucca Mountain is intersected by a volcanic vent, resulting in dispersal of contaminated ash. The speakers discussed how they will model the fluvial redistribution of this ash in the Fortymile Wash drainage basin east of Yucca Mountain. This briefing included information that had not been included in a similar talk given to the ACNW in September 2004. Dilution of ash with ambient sediment is expected to result in approximately 20-50% dilution. The time to deplete a deposited blanket of volcanic ash in the catchment basin is estimated to be 590-127,000 years. The staff assumes that all contaminated ash would be transported to (but not beyond) a 10-km-long alluvial fan beside the reasonably maximally exposed individual (RMEI) location. The staff is developing a more realistic treatment of wind effects on ash but this work is not complete.

Committee Action

The staff's briefing will assist the ACNW in preparing a white paper on the current state of knowledge of igneous activity. The Commission can use the paper as a technical basis for decisionmaking. The Committee may also prepare a letter based on the March volcanism briefings and additional volcanism talks that are scheduled for April 2006.

5. Electric Power Research Institute's Report on "Potential Igneous Processes Relevant to the Yucca Mountain Repository: Intrusive-Release Scenario"

The Committee was briefed by a representative of the Electric Power Research Institute (EPRI) on the Institute's latest study of the consequences of a hypothetical future igneous event at Yucca Mountain. The talk addressed the consequences of a basaltic dike intruding the proposed repository. EPRI considers that previous estimates of magma ascent rate and temperature were too high. Based on the work of Nicholis and Rutherford (2004), EPRI concludes that magma crystallinity and viscosity would be much higher than previously

assumed, resulting in rapid freezing of magma if it enters drifts. The result would be limited penetration of waste emplacement drifts and only a relatively small number of waste packages could be directly contacted by magma. EPRI predicts that some waste packages on each side of a magma plug would be likely to fail early due to high-temperature effects. EPRI's performance assessment indicates that probability-weighted dose due to magma intrusion would be less than for the nominal (base) case. EPRI has therefore concluded that the probability-weighted doses would comply with regulations and that no further activities need be pursued to address the intrusive igneous scenario.

Committee Action

This briefing will assist ACNW in preparing a white paper on the current state of knowledge of igneous activity. The Commission can use the paper as a technical basis for decisionmaking. The Committee may also prepare a letter based on these March volcanism briefings and additional volcanism talks that are scheduled for April 2006.

RECONCILIATION OF ACNW COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

The Committee considered the following reports from the NRC's Executive Director for Operations (EDO) during its Planning & Procedures meeting March 24, 2006:

- C EDO response dated January 25, to ACNW letter dated April 27, 2005 on NRC's Office of Nuclear Regulatory Research (RES)/U.S. Department of Agriculture ground water research. The Committee decided that it was satisfied with the EDO's response.
- C EDO response dated January 27, 2006, to ACNW letter dated June 21, 2005, on the tracking of radioactive sealed sources. The Committee decided that it was satisfied with the EDO's response.
- C EDO response dated February 3, 2006, to ACNW letter dated December 23, 2005, on West Valley Demonstration Project. The Committee decided that it was satisfied with the EDO's response.
- C EDO response dated February 7, 2006, to ACNW letter dated December 9, 2005, on the review of the NRC program on the risk from igneous activity at the proposed Yucca Mountain repository.

The Committee decided that it was satisfied with the EDO's response to Recommendation 2 on the reasonableness of parameters and assumptions presented to date regarding the exposure scenario for igneous activity. The staff is preparing additional reports to document ongoing studies, and has provided a list of these.

The Committee decided that it was not satisfied with the EDO's response to Recommendation 1. In brief, the staff disagrees with the importance of magma solidification as a process that would minimize the effects of igneous intrusion on a repository. The NRC staff has committed to keep ACNW informed about efforts to improve realism in magma-repository models and to improve understanding of the risk significance.

The Committee also decided that it was not satisfied with the EDO's response to Recommendation 3 on the use of a single value for the probability with a volcanic intersection of the proposed Yucca Mountain repository. The rationale presented indicates that the staff is not using a risk-informed approach. If the staff continues to use a single-point value approach, it should document how this decision will support a risk-informed review of the consequences of an igneous event in a license application. The staff should also consider the results of DOE's ongoing update to the 1996 probabilistic volcanic hazard assessment expert elicitation.

- C EDO response dated February 24, 2006, to ACNW letter dated December 27, 2005, on ACNW low-level radioactive waste (LLW) White Paper. The Committee decided that it was satisfied with the EDO's response.
- C EDO response dated March 1, 2006, to ACNW letter dated January 23, 2006, on Title 10 of the Code of Federal Regulations Part 63 Proposed Rule. The Committee decided that it was satisfied with the EDO's response.

PROPOSED SCHEDULE FOR THE 169th ACNW MEETING

The Committee agreed to consider the following topics during the 169th ACNW meeting to be held April 18–20, 2006:

- C Overview of Accelerator Mass Spectrometry
- C Update on DOE Chlorine-36 Studies at Yucca Mountain
- C Briefing From Representatives of the National Academy of Sciences on Their 2006 Report on the Transportation of High-Level Nuclear Waste
- C Proposed Rulemaking on Naturally Occurring Radioactive Materials
- C Update on DOE Activities at the Yucca Mountain Site
- C Update on the Nye County Independent Early Warning Drilling Program
- C Recent Developments Related to Modeling the Igneous Activity in the Yucca Mountain Region
- C Department of Energy Performance Confirmation Program Plan: NRC Staff Perspective and Update
- C Physical Capacity of Yucca Mountain for the Emplacement of High-Level Waste
- C NRC Radiation Research Program

C Discussion of draft and possible letters and reports on the following:

- Briefing From Representatives of the National Academy of Sciences on the Academy's Report on the Transportation of High-Level Nuclear Waste
- Update on DOE Chlorine-36 Studies at Yucca Mountain
- Proposed Rulemaking on Naturally Occurring Radioactive Materials
- Update on DOE Activities at the Yucca Mountain Site
- Update on the Nye County Independent Early Warning Drilling Program
- Recent Developments Related to Modeling the Igneous Activity in the Yucca Mountain Region
- DOE Performance Confirmation Program Plan: NRC Staff Perspective and Update
- NRC Radiation Research Program
- Risk-Informed Decisionmaking
- NRC Research Director Annual Update
- DOE Office of Science and Technology and International Waste Safety-Related Research
- ACNW Working Group Meeting on Draft Final Guidance to Implement NRC's License Termination Rule

Sincerely,

/RA/

Michael T. Ryan
Chairman