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

ACNWS-0161

February 3, 2006

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

Dear Chairman Diaz:

SUBJECT: SUMMARY REPORT—167TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE, JANUARY 10–12, 2006, AND RELATED ACTIVITIES OF THE COMMITTEE

During its 167th meeting, January 10–12, 2006, the Advisory Committee on Nuclear Waste (ACNW) discussed several matters and completed the following report and memorandum.

REPORT

Report to Nils J. Diaz, Chairman, NRC, from Michael T. Ryan, Chairman, ACNW regarding Title 10 of the Code of Federal Regulations Part 63 Proposed Rule, dated January 23, 2006

MEMORANDUM

Memorandum to Luis A. Reyes, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS/ACNW, regarding Proposed Rulemaking to Amend 10 CFR Parts 19, 20, and 50, dated January 11, 2006

HIGHLIGHTS OF KEY ISSUES

1. Status of Risk-Informed Decisionmaking for Nuclear Materials and Waste Application

Dennis Damon from the Nuclear Regulatory Commission's (NRC's) Spent Fuel Project Office (SFPO) provided an overview of the draft guidance on the application of risk insights in the waste and materials area. Mr. Damon summarized the Staff Requirements Memorandum on the subject (SECY-04-0182). He said that the guidance document is available for trial use in risk-informing changes to requirements and is considered living a document to be changed as a result of experience. He also discussed the trial use of three draft risk guidelines. He presented potential initiatives to risk inform licensing review guidance and the focus of inspections, and to share risk-informed experience during staff training.

ACNW members commented that it is hard to decide whether a risk assessment would be of value and that finding leading indicators is generally the appropriate approach, rather than doing risk assessment to find out why something has gone wrong. They said that writing a simple guidance document on when to consider risk-informing activities was a great idea. Members also said that some of the text in the guidance may be misleading, that the question is not whether to risk inform but whether the decision to risk-inform has merit. The Committee suggested that guidance on ways to risk inform the waste area would be helpful.

Committee Action

The Committee decided to write the Commission a letter with recommendations on the application of risk insights to Office of Nuclear Material Safety and Safeguards (NMSS) activities and to help "keep that flame alive." Draft input will be presented and discussed at the 168th ACNW meeting in March 2006. The Committee decided to postpone scheduling a working group meeting on risk-informing the materials and waste area.

2. Fabrication of Pressurized Water Reactor Uncanistered Fuel Waste Package

Mr. Al Csontos, representing NMSS's Division of High-Level Waste and Repository Safety, gave a presentation entitled "Waste Package Fabrication: Process and Effects." This was an information briefing about recent staff activities in monitoring the Department of Energy's (DOE's) work on waste package fabrication. Mr. Csontos talked about the NRC staff's current understanding of the DOE approach to the design, fabrication, and assembly of a prototype 21-PWR uncanistered nuclear fuel waste package. He also discussed the potential effects of welding on the phase stability and on the mechanical and corrosion behaviors of Alloy 22. Independent NRC studies have examined the effects of fabrication processes on corrosion. Certain fabrication techniques can reduce the localized corrosion resistance of Alloy 22 welds. For example, solution annealing improves the localized corrosion resistance of the welds. Welded and solution-annealed Alloy 22 retains significant ductility and toughness. Fabrication processes do not change the overall mechanical behavior of Alloy 22 from ductile failure to brittle fracture.

Committee Action

No letter will be prepared at this time because of DOE's October 25, 2005, announcement of plans to design a standardized canister for shipment of spent nuclear fuel (SNF). The Committee will request future briefings from both DOE and NRC when more information becomes available about this new canister design and the programmatic effects of the change.

3. Spent Fuel Transportation Package Response to the Baltimore Tunnel Fire Scenario (NUREG/CR-6886)

During its 138th meeting in November 2002, the ACNW had conducted a working group meeting on the transportation of SNF to the proposed Yucca Mountain repository. That briefing was conducted by Chris Bajwa (SFPO) and was documented in the ACNW's meeting proceedings found in NUREG/CP-0182. Among the items discussed at that meeting was a review of the hypothetical performance of an NRC-certified Holtec HI-STAR transportation cask in the July 2001 railroad fire in the Howard Street Tunnel in Baltimore, Maryland. SFPO staff contracted with the National Institute of Science and Technology (NIST) to use a fire dynamics simulator (FDS) code[1] to recreate fire conditions in the tunnel on that date and do an initial evaluation of

[1]FDS is a computational fluid dynamics computer code that models combustion and flow of hot gas in fire environments. This computer code was developed by NIST.

how the Holtec HI-STAR transportation cask would perform during that design basis fire. The nitial analysis indicated that there would be no radioactive releases from the Holtec HI-STAR cask during a fire scenario similar to the July 2001 Howard Street tunnel fire.

In September 2005, SFPO announced in the *Federal Register* the availability of a contractor report prepared by the Pacific Northwest National Laboratory on an updated, three-dimensional analysis of the 2002 Howard Street tunnel fire scenario using three NRC-certified cask designs. The report was published as NUREG/CR-6886 (Adkins and others, 2005[2]) and was prepared with the assistance of NIST and the Center for Nuclear Waste Regulatory Analyses.

During this meeting, Mr. Earl Easton, representing SFPO discussed the key modeling assumptions, conservatisms, and results of the NUREG/CR-6886 tunnel fire analysis using the FDS code. Citing the staff's report, he said it was extremely unlikely that such an event would occur while an SNF transportation cask was in the tunnel. Moreover, if the event did occur, and there were releases of radioactive material, those releases would be very small and would pose no significant danger to the public or first responders. In light of these findings, Mr. Easton said that the staff did not believe any NRC regulatory action was needed. He concluded his presentation by summarizing the public comments received on the tunnel fire analysis.

Following questions and comments from the ACNW members and staff, Mr. Bob Halstead, representing the State of Nevada, provided the State's perspective on the NUREG/CR-6886 analysis. His comments were drawn in part from earlier comments by the State on NUREG/CR-6886. The most recent set of State of Nevada comments, dated December 30, 2005, was distributed at the meeting.

Committee Action

The SFPO staff intends to finalize NUREG/CR-6886 later this fiscal year and has agreed to brief the Committee on the disposition of public comments as part of the tunnel fire analysis documentation process.

4. White Paper on Transportation

The Commission has asked the ACNW to review the NRC staff plans for the structural testing of a SNF transportation cask. To help the Committee prepare to review and comment on this plan, the ACNW decided to write a white paper on the subject of transportation. Dr. Weiner is the designated lead for this effort. During this meeting, she led a Committee discussion on the content of the white paper. As a result of the discussion, the Committee decided on two actions. First, the ACNW staff will review and summarize past Committee letters on transportation cask testing issues. Second, Dr. Weiner will continue to develop and annotate

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[2]H. E. Adkins, M. Cuta, and B.J. Koeppel, "Spent Fuel Transportation Package Response to the Baltimore Tunnel Fire Scenario–Draft Report for Comment," NUREG/CR-6886, U.S. Nuclear Regulatory Commission, November 2005.

the outline to allow for additional Committee review and discussion at the next ACNW meeting. Mr. Easton volunteered to give the members and staff key references that the ACNW could cite in the paper.

Committee Action

The Committee intends to review and discuss the transportation white paper outline at the ACNW's 168th meeting. At that time, the ACNW staff will also present a summary of past ACNW letters on transportation casks.

5. Source Characterization (Spatial Analysis and Decision Assistance Code)

The Committee discussed the features of the Spatial Analysis and Decision Assistance (SADA) model with representatives of the Office of Nuclear Regulatory Research (RES) staff. SADA is being used to design a site-monitoring network that will make the most efficient use of monitoring resources. SADA is a Microsoft Windows-based freeware program. Development of the coding and the model has been supported by DOE, the U.S. Environmental Protection Agency, and the NRC. SADA can be obtained from the Institute for Environmental Modeling at the University of Tennessee. SADA includes integrated modules for visualization, geospatial analysis, statistical analysis, human health risk assessment, ecological risk assessment, cost/benefit analysis, sampling design, and decision analysis.

Committee Action

This briefing was for information only.

6. Use of Dedicated Trains for Transportation of High-Level Radioactive Waste and Spent Nuclear Fuel

Michele Sampson, representing the Federal Railroad Administration (FRA) of the U.S. Department of Transportation (DOT), briefed the Committee on the results of an FRA study on the use of dedicated trains for transporting SNF and other high-level radioactive waste (HLW).

Ms. Sampson said that the study was mandated by the Hazardous Materials Transportation Uniform Safety Act of 1990 and was conducted over many years by the Volpe National Transportation Systems Center (Research and Innovative Technologies Administration at DOT) under contract to the FRA. She indicated that the study involved a workshop and other coordination activities with key stakeholders, including DOE and NRC. Comparative analyses were done of three train services (regular trains, key trains, and dedicated trains), using a standardized cask prototype and representative rail routes. The analyses considered operational safety and the risk of latent cancer fatalities associated with the dose from incident-free transportation and accident conditions. The study found that nonincident risk from the entire shipping campaign would be very low (less than one latent cancer fatality), regardless of the type of the transportation service used. The operational and escort labor costs of dedicated train shipments are essentially equal to or less than the costs for the other rail shipment services considered in the study. The study identified followup actions to determine if a

rulemaking based on the study findings is warranted and to review and update the FRA Safety Compliance Oversight Plan.

Ms. Sampson responded to several questions from the Committee members, ACNW staff, and members of the public. Committee members questioned the use of collective dose to calculate the fatal cancer risk and the use of four significant figures to characterize the dose. Two members of the public, representing the State of Nevada, also made comments.

Committee Action:

This was an information briefing. No action is planned by the Committee as a result of this briefing at this time.

7. Preparation for Commission Briefing on January 11, 2006

The Committee reviewed and finalized slides in preparation for the Commission briefing on January 11, 2006.

RECONCILIATION OF ACNW COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

None

PROPOSED SCHEDULE FOR THE 168th ACNW MEETING

The Committee agreed to consider the following topics during the 168th ACNW meeting, to be held March 22–24, 2006:

- Department of Energy's Office of Science and Technology and International Waste-Safety Related Research
- Update on DOE Site Activities at Yucca Mountain
- Working Group Meeting on Draft Final Guidance to Implement the License Termination Rule
- Review of an NRC-sponsored journal paper entitled "Dynamic Controls on Summit and Flank Eruptions of Basalt"
- Electric Power Research Institute Report on "Potential Igneous Processes Relevant to the Yucca Mountain Repository: Intrusive Release Scenario"
- Review of an NRC-sponsored journal paper entitled "Modeling the Long-Term Fluvial Redistribution of Tephra in Forty Mile Wash, Yucca Mountain"
- Annual Briefing by the Office of Nuclear Regulatory Research Director

- Highlights of the National Academy of Sciences Committee Meeting on Assessing the Performance of Surface and Subsurface Engineering Barriers

- ACNW White Paper on HLW Transportation

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

  - Enhancements to the Consequence Modeling of Igneous Activity (working title)

  - Department of Energy's Office of Science and Technology and International Waste-Safety Related Research

  - Working Group Meeting on Draft Final Guidance to Implement the License Termination Rule

  - Office of Nuclear Regulatory Research Director Briefing

Sincerely,

**/RA/**

Michael T. Ryan
Chairman