



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

ACNWS-0168

**Revised March 19, 2007**

January 22, 2007

The Honorable Dale E. Klein  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Chairman Klein:

SUBJECT: SUMMARY REPORT—175<sup>TH</sup> MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE, DECEMBER 12–14, 2006, AND RELATED ACTIVITIES OF THE COMMITTEE

During its 175<sup>th</sup> meeting, December 12–14, 2006, the Advisory Committee on Nuclear Waste (ACNW) discussed several matters and completed the following letters and memoranda:

**LETTERS**

Letters to Dr. Dale E. Klein, Chairman, U.S. Nuclear Regulatory Commission (NRC), from Dr. Michael T. Ryan, Chairman, ACNW:

- Working Group Meeting on Using Monitoring to Build Model Confidence, dated December 27, 2006
- Proposed Revision 1 to Regulatory Guide 1.112, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Nuclear Power Reactors," dated January 4, 2007
- Working Group Meeting on Decommissioning Lessons Learned, dated January 8, 2007
- Report of the French Academy of Sciences, "The dose-Effect Relationship and Estimating the Carcinogenic Effects of Low Doses of Ionizing Radiation," dated January 11, 2007

**MEMORANDUM**

- Memorandum to Brian W. Sheron, Director, Office of Nuclear Regulatory Research, NRC, Subject: Closure of Generic Safety Issue 196, "Boral Degradation," dated December 13, 2006

HIGHLIGHTS OF KEY ISSUES1. Semiannual Briefing by the Office of Nuclear Material Safety and Safeguards

Mr. Jack Strosnider, Director, Office of Nuclear Material Safety and Safeguards (NMSS), began the briefing by acknowledging that progress has been made in the interactions between NMSS and ACNW by proactively identifying activities and issues for which NMSS requests ACNW comment and input. The 12-month rolling calendar has been a helpful tool, but these interactions can be improved even further by planning future activities consistent with budget cycles, which will allow NMSS to properly support ACNW. NMSS will continue to focus on identifying activities as early as possible so that ACNW can properly express its interest on the topics and coordinate upcoming briefings in a timely manner. The independent comments received from ACNW are appreciated and important in helping NMSS develop a more robust program as well as withstand the scrutiny that may come from a variety of sources. The recent (October 1, 2006) reorganization created the new Office of Federal and State Materials and Environmental Programs (FSME) and left NMSS with three divisions—the Division of Fuel Cycle Safety and Safeguards (FCSS), dealing with the production (conversion, enrichment, and fabrication) of nuclear fuel; the Division of Spent Fuel Storage and Transportation (SFST), dealing with spent fuel (storage and transportation); and the Division of High-Level Waste Repository Safety (HLWRS), dealing with the ultimate disposition of the fuel. Representatives from these three divisions addressed the Committee.

Mr. Gary Janosko, Deputy Director of FCSS, identified three subject areas for which the division may seek ACNW assistance in the near term—the Global Nuclear Energy Partnership (GNEP), advanced technologies (such as the separation of isotopes by laser excitation (SILEX)), and mixed oxide (MOX) fuel. (On the second day of the ACNW meeting, attendees heard a presentation on the conceptual approach of NMSS to the licensing of a GNEP reprocessing plant.) SILEX is a laser-based enrichment process. A letter of intent from Global Nuclear Fuels (Wilmington, North Carolina) indicates that the licensee first plans to build a test loop, with a license amendment expected for January 2007. If this pilot test loop is successful, the agency expects to receive a license application for a new enrichment facility in the first quarter of fiscal 2008. Because of the classified nature of this enrichment process, more could not be discussed during this meeting. The division expects the acceptance review of the MOX application to end by January 2007. The staff deemed the original application insufficient, but, based on interactions between the applicant and staff, the current application now includes information from the integrated safety analysis summary document and complies with NRC regulations.

Mr. Lawrence Kokajko, Director, Division of High-Level Waste Repository Safety, mentioned that the Yucca Mountain (YM) license application is expected by June 30, 2008, a date potentially impacted by both the local and Federal political environments, including the composition of the new Congress. Nevertheless, the staff is preparing for the arrival of the application. The agency recently issued an interim staff guidance (ISG) document on the review of the methodology for seismically initiated event sequences. (On the first day of the meeting, attendees heard a briefing on this ISG later in the meeting.) Three other preclosure ISGs are due in the near term. The

division has also participated in identifying potential risk insights for surface facilities and spent fuel operations. A number of technical exchange meetings with the U.S. Department of Energy (DOE) have already taken place. The staff is interested in a variety of other technical exchange meetings related to preclosure analysis, such as proposed design and operation, hazard identification, and event sequences. In addition, DOE has recently released its performance specification for the transportation, aging, and disposal (TAD) canister. The staff will monitor how different transportation/storage cask vendors respond to these DOE specifications and eventually submit to the NRC their license applications for review. In the postclosure arena, the staff is considering a revision to their total-system performance assessment code, expected by late 2007, to include waste package and drip shield performances, drip degradation, unsaturated and saturated zone flow, and transport and consequences of destructive events. The staff has requested several future interactions with DOE on their total system performance assessment (TSPA) code. Once the U.S. Environmental Protection Agency releases its new standard for YM, the staff should issue conforming regulations approximately 6 to 9 months later.

Mr. William Brach, Director, Division of Spent Fuel Storage and Transportation, identified several areas that may be of interest to the ACNW—moderator exclusion when addressing criticality scenarios during transportation, burnup credit when addressing criticality scenarios during loading and transportation, transport of high burnup fuel and the structural response of materials once exposed to high fluence, the upcoming TAD canister designs in response to DOE specifications, the increasing complexity of technical reviews because of the optimized designs and subsequent reduced safety margins, and the uncertainty in the national spent fuel management strategy where GNEP and storage facilities are ideas in circulation.

#### Committee Action

As this was simply a briefing by NMSS on current and near-future issues that may be of interest to the ACNW, the Committee will take no specific action on the subject. The Committee looks forward to future NMSS briefings.

#### 2. RACER: Tools and a Process to Guide Decisions about Risk Reduction for Contaminants in the Environment

Dr. John Till of Risk Assessment Corporation gave a presentation on the RACER methodology (**R**isk **A**nalysis, **C**ommunication, **E**valuation and **R**eduction), a risk-based decision support tool developed by Dr. Till for application at the Los Alamos National Laboratory (LANL), New Mexico, and vicinity.

Dr. Till presented the principles upon which the RACER methodology was based, described the databases used in RACER, explained the risk analysis tool and its uses, and showed how the decision support tool can be used to assist in determining courses of action. Dr. Till then demonstrated the application of the RACER methodology using the databases developed from sources of information at LANL.

### Committee Action

The Committee agreed not to write a letter to the Commission on RACER at the conclusion of this meeting. However, the Committee agreed to include relevant information from the presentation in a paper consolidating insights in the area of decommissioning that the Committee plans to prepare in the spring of 2007.

### 3. Nuclear Energy Institute and Electric Power Research Institute Views on NRC Interim Staff Guidance DHLWRS-ISG-01 on Seismic Event Sequences

The NRC issued ISG DHLWRS-ISG-01 in May 2006 as a draft for public comment. In June 2006, the staff conducted a technical exchange meeting with DOE to discuss the draft. In September 2006, the staff conducted a separate public meeting on the draft with Nuclear Energy Institute (NEI) and Electric Power Research Institute (EPRI) representatives before finalizing the guidance later that month. In November 2006, at its 174<sup>th</sup> meeting, the ACNW heard about the scope of the staff guidance and the history of its development. At that time, the staff had received 23 comments from 5 different organizations on draft DHLWRS-ISG-01. During the November 2006 ACNW meeting, the NRC staff stated that it had responded satisfactorily to all technical stakeholder comments on DHLWRS-ISG-01, including those of DOE, EPRI, and NEI.

During the 175<sup>th</sup> meeting, NEI and EPRI representatives briefed the ACNW on their views regarding DHLWRS-ISG-01. Despite any earlier statements, they appeared to have three continuing concerns. First, they believed that the guidance outlined in DHLWRS-ISG-01 places more rigorous seismic design requirements on DOE than would be applied to the design of a nuclear power plant. Second, they suggested that licensees generally consider NRC ISGs to be de facto regulations. Consequently, they are treated as such in other nuclear regulatory applications. Their specific concern focused on the possibility that the staff would find it unacceptable if DOE used another approach to evaluate seismic event sequences other than that described in DHLWRS-ISG-01. Third, the NEI and EPRI representatives stated that the ISG was without precedent and lacked technical support. In conclusion, these two stakeholders recommended that the agency withdraw DHLWRS-ISG-01. In rebuttal, staff representing the Division of High-Level Waste Repository Safety and the Center for Nuclear Waste Regulatory Analyses disputed several of the NEI-EPRI technical claims regarding DHLWRS-ISG-01.

### Committee Action

The NRC staff suggested that NEI-EPRI had provided new information that would benefit from additional study by the NRC staff and its technical assistance contractor. To this end, the staff suggested that its dialogue with these two stakeholders continue. The ACNW intends to monitor progress in this dialogue. The Committee also intends to request a briefing on the recently issued American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI) consensus standard ASCE/SEI 43-04 on

seismic design criteria for nuclear facilities (ASCE, 2005<sup>1</sup>), which forms the technical basis for DHLWRS-ISG-01, as resources permit.

4. Proposed Revision to Standard Review Plan Section 11.2, "Liquid Waste Management System"

Dr. Jean-Claude Dehmel of the Office of Nuclear Regulatory Research discussed the proposed updates and revisions to Section 11.2, "Liquid Waste Management System," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," (referred to hereafter as the SRP). He explained that the staff has updated SRP Section 11.2 to include the requirements in Title 10, Section 20.1406, "Minimization of Contamination," of the *Code of Federal Regulations* (10 CFR 20.1406) as an acceptance criterion and guidance for reviews of the liquid waste management system, and to include more information on the acceptability of mobile waste treatment systems. He noted that the staff has made other revisions to update the section in terms of changes in reactor licensing procedures and rule language since the last time the section was revised. The SRP section incorporates information from the Tritium Task Force Report and from lessons learned in decommissioning developed by NMSS (now FSME).

In response to questions, Dr. Dehmel explained that the NRC will not formally release the SRP for public comment, but it is publically available now for commenting. The staff will address any public, staff, or stakeholder comments that are received and finalize the section for March 2007 publication in order to support the reviews of new reactor license applications that the agency expects to receive in the fall of 2007.

Committee Action

The Committee agreed not to write a letter to the Commission on the proposed revisions to SRP Section 11.2 at the conclusion of this meeting. However, the Committee agreed to write a letter that consolidates the Committee's reviews on all SRP sections after they have been presented to the Committee.

5. Public Comments on the NRC 2006 Low-Level Radioactive Waste Strategic Planning Initiative

In July 2006, the NRC staff announced in the *Federal Register* (NRC, 2006<sup>2</sup>) that it was conducting a strategic assessment of its commercial low-level waste (LLW) regulatory program and requested comments on the program. The objective of this assessment was to identify and prioritize activities that the NRC staff could undertake to ensure a

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1 American Society of Civil Engineers, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities," ASCE/SEI 43-05, Nuclear Standards Committee, Reston, Virginia, 2005.

2 U.S. Nuclear Regulatory Commission, "Request for Comments on the Nuclear Regulatory Commission's Low Level Radioactive Waste Program," *Federal Register*, Vol. 71, No. 130, pp. 38675–38676, July 7, 2006.

stable, reliable, and adaptable regulatory framework for effective LLW management, while also considering future needs and changes that may occur in the Nation's commercial LLW management system. As part of this strategic assessment, the staff requested stakeholder input.

During this meeting, a representative from the Division of Waste Management and Environmental Protection (DWMEP) briefed the Committee on the public comments received in response to its July 2006 request. The NRC received 46 sets of stakeholder comments representing 14 distinct LLW topic areas. On balance, the DWMEP speaker noted that the public comments were similar to those previously identified by stakeholders during the May 2006 ACNW LLW Working Group meeting (Ryan, 2006<sup>3</sup>). In addition to comments on commercial LLW management issues, the staff received stakeholder comments on issues related to the management of low-activity radioactive wastes as well as greater-than-Class-C LLW. As a next step, the staff noted that it is preparing a Commission paper that summarizes the public comments received and provides a number of recommendations on one or more potential NRC actions to address those comments.

#### Committee Action

The Commission paper on the NRC's LLW Strategic Planning Initiative, and related program recommendations, is still under development. Initially, this paper was due to the Commission by the end of calendar year (CY) 2006; however, the staff received an extension until early CY 2007. This paper will be the subject of a future ACNW briefing once the paper is publicly available.

#### 6. Conceptual Licensing Process for Global Nuclear Energy Partnership Facilities

The Committee met with NMSS/FCSS staff to discuss a draft SECY response to SRM-SECY-06-0066, "Regulatory and Resource Implications of a Department of Energy Spent Nuclear Fuel Recycling Program." The staff requirements memorandum directed the staff to develop a conceptual licensing process for GNEP facilities, at a pace commensurate with the progress made by DOE in identifying the technologies it plans to pursue. The staff gave an overview of GNEP and options for regulating two of the GNEP facilities—the spent nuclear fuel reprocessing facility and the advanced burner reactor (ABR). The regulatory options for the spent fuel reprocessing facility include using current regulations contained in 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants"; expanding 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," to accommodate reprocessing; or creating a new regulation. For the ABR, regulatory options include using 10 CFR Part 50 and 10 CFR Part 52, the technology neutral framework currently under development (10 CFR Part 53), or creating a new regulation. As another option for licensing either facility, the NRC could issue a licensing-basis document, consider

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3 Ryan, M.T., Advisory Committee on Nuclear Waste, Letter to the Honorable Dale E. Klein, U.S. Nuclear Regulatory Commission, "Observations from the ACNW Low-Level Radioactive Waste Working Group Meeting of May 23–24, 2006," August 16, 2006.

public comments, and then execute a Commission Order that would allow the facility to operate.

Some of the key issues and challenges discussed during the meeting included treating the reprocessing facility and the ABR as an integrated unit, handling plutonium and actinides during fuel fabrication, and licensing the ABR within the current 10 CFR Part 50/10 CFR Part 52 framework. Understanding the technology and acquiring and maintaining staff skills are significant factors affecting NRC readiness to license GNEP facilities. The presentation concluded with a summary of additional technical areas and regulations that will require consideration during the development of the GNEP licensing framework.

#### Committee Action

As this presentation was for information only, no Committee action was necessary. The Committee plans to write a letter to the Commission (early CY 2007) on the staff's licensing approach to GNEP. The letter will be based on the information presented at the meeting, including a draft SECY response to SRM-06-0066 and an ACNW white paper that is currently under development.

#### 7. Closure of Generic Safety Issue 196, "Boral Degradation"

Mr. Christopher L. Brown, an ACNW staff member, briefed the Committee on a degradation mechanism that can occur on the surface of boral, a neutron absorber used in storage casks containing commercial spent nuclear fuel for criticality safety. Mr. Brown discussed the fabrication process and how steam blisters occur on the material's surface when exposed to high heatup rates and high hydrostatic pressures. In addition, Mr. Brown provided the Committee with observations reported by the industry and the consequences of boral blistering on criticality safety. Mr. Patrick Baronowsky, a deputy director, and Dr. Raji Tripathi, a senior nuclear engineer, from the Division of Operating Experiences and Risk Analysis in the Office of Nuclear Regulatory Research, briefed the Committee on the regulatory and technical basis for closing out GSI-196 from the generic safety issue list. In addition, Dr. Tripathi discussed the staff's activities leading to the closeout of GSI-196. Mr. Calvin Hopper, a representative from Oak Ridge National Laboratory, supported the briefing by describing the analysis and assessment made by the laboratory of boral blistering and how blistering does not impair neutron attenuation characteristics.

#### Committee Action

The Committee has no objection to the staff's proposal concerning the closure of GSI-196.

## **RECONCILIATION OF ACNW COMMENTS AND RECOMMENDATIONS/EXECUTIVE DIRECTOR FOR OPERATIONS COMMITMENTS**

The Committee did not receive any reports for reconciliation from the NRC Executive Director for Operations.

## **PROPOSED SCHEDULE FOR THE 176<sup>TH</sup> ACNW MEETING**

The Committee agreed to consider the following topics during its 176<sup>th</sup> meeting, to be held February 12–14, 2007:

- ACNW Working Group on the Igneous Activity White Paper
- Savannah River National Laboratory (SRNL) Workshop on Cementitious Materials Used in Waste Determination Activities
- Semiannual Briefing by the Office of Federal and State Materials and Environmental Management Programs
- Briefing on International Conferences on Decommissioning and Low Level Waste Subjects **[Note:** A portion of the briefing may be closed pursuant to 5 U.S.C. 552b(c)(4) to discuss information obtained from a foreign source that may be treated as confidential.]
- Possible Use of Moderator Exclusion for Transportation Packages

Sincerely,

**/RA/**

Michael T. Ryan  
Chairman

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