

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

ACNW-0171

May 10, 2007

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

# SUBJECT: SUMMARY REPORT—178TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE, APRIL 10–12, 2007, AND RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Klein:

During its 178<sup>th</sup> meeting on April 10–12, 2007, the Advisory Committee on Nuclear Waste (ACNW or the Committee) completed the following reports and discussed several issues.

## **REPORTS**

Reports to Dale E. Klein, Chairman, NRC, from Michael T. Ryan, Chairman, ACNW:

- "Proposed Rulemaking on Groundwater Protection at In Situ Leach Uranium Recovery Facilities (Agencywide Documents Access and Management System (ADAMS) No. ML071290707), dated May 9, 2007.
- "Use of Credit for Moderator Exclusion in the Licensing of Spent Nuclear Fuel Transportation Packages" (ADAMS No. ML071150483), dated April 23, 2007.

## HIGHLIGHTS OF KEY ISSUES

1. <u>Status of Overall Geologic Repository Program at Yucca Mountain: Views of the Director</u> of the U.S. Department of Energy's (DOE's) Office of Civilian Radioactive Waste <u>Management</u>

At the invitation of the Committee, Mr. Edward (Ward) F. Sproat, III, shared his views regarding progress being made by the U.S. Department of Energy (DOE) in completing a licence application necessary for an NRC construction authorization for a geologic repository at Yucca Mountain, Nevada. As already widely reported in the media, Mr. Sproat noted that DOE expects to submit a license application to the NRC by June 2008, based on Title 10 Part 63 of the *Code of Federal Regulations* (CFR) ("Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada"). He cautioned that the DOE's success in meeting the projected June 2008 license application submittal date relied on receiving \$494.5 million in full spending authority from Congress in fiscal year 2008. Mr. Sproat also noted DOE was in the process of advancing a draft legislative proposal through Congress that DOE managers believed was necessary to ensure successful operation of the repository should

the NRC grant a construction authorization. Key elements of that draft legislative proposal included granting DOE greater access to the Nuclear Waste Fund, permanent withdrawal of certain public lands for operation of the geologic repository, and repeal of the 70,000 metric ton heavy metal legislative limit on the capacity of any Yucca Mountain repository.

#### **Committee Action**

Committee members were made aware of current high-level waste issues faced by DOE in their preparation for a license application. A letter will not be written at this time. Information, however, supports Committee plans to advise the Commission on DOE activities prior to submittal of the license application.

2. <u>Staff Briefing on International Atomic Energy Agency (IAEA) Requirements Document</u> WS-R-4: "Design and Operation of Facilities for Geological Disposal of Radioactive Waste"

Within the International Atomic Energy Agency (IAEA), there is the Waste Safety Standards Advisory Committee (WASSAC), a standing committee that focuses on the safe management of long-lived radioactive wastes in geologic repositories. The WASSAC develops safety requirements for all phases of geologic repository operations, i.e., planning, design, disposal operations, and closure. The NRC participates in WASSAC activities to ensure compatibility of its regulatory programs with international standard-setting efforts and improve public confidence in its programs.

In 2005, the WASSAC completed an initial draft of an IAEA Safety Guide titled "Design and Operation of Facilities for Geological Disposal of Radioactive Waste" (DS-334). DS-334 provided general guidance to policy makers, regulators and operators concerned with the development and regulatory control of these types of facilities. Supporting DS-334 Is a companion IAEA/WASSAC Safety Requirements document titled "Geological Disposal of Radioactive Waste" (DS-154). DS-154 described specific safety objectives for both the pre-and post-closure phases of repository operations, but did not make any specific, quantitative recommendations concerning the duration (time) over which the safety objectives are to apply. Because of the relative maturity of the domestic high-level waste (HLW) disposal program, the United States (specifically the NRC) has played a leadership role in the development of DS-154. At its 161<sup>st</sup> meeting in July 2005, the NRC staff provided the ACNW with an information briefing on DS-154. Later, in 2006, DS-154 was approved by IAEA members and issued in final form but under a new control number, WS-R-4: "Design and Operation of Facilities for Geological Disposal of Radioactive Waste."

During this meeting, a staff representative from the Division of High-Level Waste and Repository Safety summarized the content of WS-R-4 and described how it comported with the NRC's site specific regulatory framework for Yucca Mountain, Nevada, found at 10 CFR Part 63. During the presentation, it was noted that WS-R-4 was consistent with 10 CFR Part 63 and in a few cases, more stringent. It was also noted essentially no changes were made to WS-R-4 over the earlier draft (DS-154).

#### Committee Action

This presentation informed the Committee members about the NRC's role in the international community in developing standards for geological disposal of radioactive waste. A letter will not be written at this time.

3. <u>Interim Staff Guidance (ISG)-3: "Preclosure Safety Analysis—Dose Performance Objectives</u> and Radiation Protection Program to Supplement the Yucca Mountain Review Plan"

Sheena Whaley, Chief of the Engineering Branch, from the Division of High-Level Waste Repository Safety (HLWRS), briefed the Committee on the HLWRS Interim Staff Guidance (ISG)-03, "Preclosure Safety Analysis - Dose Performance Objectives and Radiation Protection Program." The purpose of this ISG is to supplement the Yucca Mountain Review Plan (NUREG-1804, Revision 2, Final Report) for the staff's review of consequence estimates for the preclosure safety analysis and the associated radiation protection program (RPP). The RPP will be implemented by the DOE during geologic repository operation area (GROA) operations. Ms. Whaley explained what DOE should present in the license application and what the staff should evaluate in reviewing the GROA activities in the application. It was explained to the Committee that guidance was added on what constitutes a sufficient description of a RPP and adequate technical bases for consequence estimates. This additional information was needed in the ISG to ensure compliance with the performance objectives of 10 CFR Part 63 and radiation protection requirements of 10 CFR Part 20 ("Standards for Protection Against Radiation"). Ms. Whaley concluded her presentation by discussing several performance objectives for normal operations and event sequences.

#### Committee Action

The Committee supports the staff's proposal to issue this guidance.

4. <u>Proposed Revision to Standard Review Plan Chapters 11.3 and 11.4 for New Reactor</u> <u>Licensing</u>

Jean-Claude Dehmel of the Office of New Reactor Programs (NRO) briefed the Committee on the proposed updates and revisions to Chapter 11.3, "Gaseous Waste Management System" (GWMS), and Chapter 11.4, "Solid Waste Management System" (SWMS) of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants." He explained the Standard Review Plan (SRP) chapters have been updated to include 10 CFR Part 20.1406, "Minimization of Contamination," as an acceptance criteria and guidance for reviews of the GWMS and SWMS to meet this requirement, and to include more information on acceptability of mobile waste treatment systems. He explained that other changes have been made to bring the chapters up-to-date with reactor licensing procedures and rule language since the last time they were revised. The SRP chapters incorporate, where appropriate, information from the Tritium Task Force Report and from lessons learned in decommissioning developed by the now Office of Federal and State Materials and Environmental Management Programs (FSME).

In response to questions from the Committee, Dr. Dehmel discussed the use of the Gaseous and Liquid Effluent (GALE) Computer Code that is referenced as an approved methodology in the two SRP Chapters. The use of the GALE code has been a concern of the Committee from two previous briefings (on SRP Chapter 11.2, "Liquid Waste Management System," of NUREG-0800 and Reg Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) – Effluent Streams and the Environment").

#### **Committee Action**

The Committee agreed to write a letter that consolidates the Committee's reviews on all SRP Radioactive Waste Management Chapters (Chapters 11.2 through 11.5) following the presentation for Chapter 11.5, "Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems," which is scheduled for the May 2007 Committee meeting.

5. <u>Path Forward on an In situ Leach (ISL) Rulemaking—Summary of Meetings with the</u> <u>Environmental Protection Agency (EPA) and the National Mining Association—Next Steps</u>

FSME staff representatives briefed the Committee on the status of a rulemaking on groundwater protection at in-situ leach (ISL) uranium recovery facilities. The staff discussed the legislative and regulatory background for the licensing of uranium recovery operations, as well as the history of the rulemaking (including efforts to eliminate dual regulation), interactions with the U.S. Environmental Protection Agency (EPA), public interactions with the National Mining Association, and staff strategy and path forward for rulemaking development. The FSME staff indicated that the regulations for uranium recovery operations are grounded in the Uranium Mill Tailings Radiation Control Act and the Atomic Energy Act, as amended, and that they include the EPA standards in 40 CFR Part 192 ("Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings") and NRC regulations in Appendix A to 10 CFR Part 40 ("Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content"). They noted that these regulations apply mainly to conventional uranium mills and mill tailings disposal sites, and do not explicitly address uranium recovery by the ISL method.

The staff stated that ISL is currently the uranium mining method of choice and that the existing regulations provide little or no specific provisions for regulating uranium recovery by this method. They explained that ISL facilities are regulated by the NRC through license conditions, based on guidance in NUREG-1569 ("Standard Review Plan for In Situ Leach Uranium Extraction License Applications"), which calls for restoration of groundwater quality within the exploited production zone and any affected aquifers to pre-operational (baseline) water quality conditions (Primary Restoration Standards), or pre-operational class of use (Secondary Restoration Standards). If a constituent cannot technically or economically be restored, an applicant must demonstrate that the resulting higher concentration would not degrade adjacent groundwater resources unacceptably or threaten health and safety. They added that ISL operators must also obtain permits from the EPA or EPA-authorized states under the underground injection control program (40 CFR Parts 144 and 146). The staff said that their proposed strategy for the rulemaking is to create a new criterion in 10 CFR Part 40, Appendix A, which will address groundwater protection at ISL facilities, and that they will forward the proposed strategy to the Commission by April 30, 2007. The staff also said that they will brief

the Committee on the technical basis for the rulemaking in the future as needed. At the end of the briefing, the staff answered questions by the Committee members and ACNW staff on several topics, including the technical basis for the rulemaking, stakeholder involve- ment, establishing background/baseline groundwater quality, radioactive and non-radioactive contaminants in the mined zone, groundwater restoration standard, post-restoration monitoring, alternate concentration limits, effluent disposal, updating existing regulatory guides, and risk-informing the regulations.

#### Committee Action

The Committee wrote a letter on Committee advice and recommendations on the impending development of the rulemaking.

6. <u>Briefing on the Multi-Agency Radiation Survey and Assessment of Materials and</u> Equipment (MARSAME) Manual

Robert Meck of the Office of Nuclear Regulatory Research (RES) briefed the Committee on the Draft Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME). Dr. Meck provided the basic survey approaches recommended in the Manual, emphasizing the statistical methodologies for addressing uncertainties. He provided handouts showing the major differences and similarities with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), and discussed the application of the MARSAME approach using one of the case studies that is provided in MARSAME. Dr. Meck said the major advantages of the MARSAME approach over others is simply that it is being endorsed by multiple agencies who have operations and facilities at which free release of radioactively contaminated material is an issue, and that the methodology is technically-defensible and reproduceable.

#### **Committee Action**

The Committee expressed interest in hearing about the implementation of MARSAME once it is final. A letter may be issued at that time.

#### 7. <u>Scope and Methodology of the Government Accountability Office's (GAO's) Ongoing</u> <u>Review of the Global Nuclear Energy Partnership (GNEP) Effort</u>

The Committee continues to remain informed of developments in the area of nuclear fuel recycling. A GAO representative provided the ACNW with an overview of the preliminary scope and objectives for a review they plan to undertake on DOE's GNEP program. The review will focus on the domestic technology development component rather than the international effort, which includes working with other nations to develop and deploy advanced nuclear recycle and reactor technologies.

Three GAO objectives for the review were identified: (a) to assess the DOE's basis for selecting the recycling strategy and the associated suite of technologies that would be used in the GNEP, (b) to review DOE's assessment of the maturity of the associated technology, and (c) to assess DOE's plan for advancing GNEP. The last objective also considers a wide range of issues, including NRC licensing of the GNEP facilities, and time that would be needed for rulemaking if

DOE proceeds with GNEP. Sub-objectives for each of the 3 objectives were identified and included, e.g., how the DOE plans to analyze the volumes, treatment, and disposal of radioactive waste, and how the DOE will conduct research and development on the various waste forms that have been identified. In closing, the Committee offered its views on issues that GAO may want to consider during their review, and associated challenges that GNEP represents from a regulatory perspective.

### **Committee Action**

Information supports the Committee's development of a white paper on spent nuclear fuel recycle.

### 8. ACNW White Paper on Volcanism

ACNW Member William Hinze led the discussion about the white paper on igneous activity at Yucca Mountain. A draft of the report had been published in December 2006 and an ACNW working group meeting on volcanism was held in February 2007. During the March ACNW meeting, the members reviewed a preliminary set of observations and conclusions. These have now been incorporated in the report and were further discussed at the April ACNW meeting. Four handouts containing information related to the white paper were provided to the members. These included a revised summary and conclusions, a new version of the volcanism topics table that will be included in the summary section, a new version of the executive summary, and a draft of the cover letter to transmit the report to the Commission. The summary and conclusions consist of various elements: (a) an introduction; (b) a discussion of the nature, likelihood or probability, and consequences; and (c) uncertainties and alternative models. Dr. Hinze then read into the record the contents of the four white paper handouts.

#### **Committee Action**

On departing this ACNW meeting, members were provided current drafts of the volcanism report on CD and in hard copy. The members were asked to provide any additional comments within two weeks so that a final version of the report and transmittal letter could be prepared for consideration at the May ACNW meeting. The final report is due to the Commission in June 2007.

#### 9. Update on West Valley Draft Environmental Impact Statement

Dr. Keith McConnell and Mr. Chad Glenn representing the Division of Waste Management and Environmental Protection (DWMEP) provided a briefing on FSME's results of the core team process undertaken at the West Valley Site to identify a new decommissioning option for closure of the site to be evaluated in the site's Draft Environmental Impact Statement (DEIS). Staff briefly explained the use of the core team process, its use at other facilities like West Valley and the successes that were achieved, and the results of the process at West Valley to date.

A new decommissioning option tentatively agreed to within the core team was described. This option involves a phased decommissioning approach called a "delayed closure alternative." In summary, decommissioning would achieve an "enhanced" interim end state first, and then, following evaluation of further technical- and policy-related information, a delayed closure end state will be reached.

The "enhanced" interim end state would result in interim closure activities being undertaken to stabilize the NRC Disposal Area (NDA), remove additional liquid remaining in the high-level waste tanks, mitigate groundwater contamination at the site's North Plateau, and evaluate options for relocation of the HLW canisters to another location at the site. The delayed closure end state would result in the removal of all process buildings in a stabilized site (including further stabilization of the NDA if necessary), and the relocation of HLW canisters awaiting shipment to a deep geologic disposal facility.

The FSME staff representatives explained that there are several technical issues that need to be decided in order to fully achieve the "enhanced" interim end state and evaluate it fully in the DEIS (e.g., the extent of interim actions to be taken at the NDA). These decisions are planned to be made over the next several months by the core team. At the conclusion of the decision-making process, full evaluations of the new alternative will be made for the DEIS.

The DWMEP staff would like to provide a briefing to the ACNW, and acquire feedback from the Committee, on these three products: (a) the model regulatory framework that will be developed by the staff to provide the bases for regulatory decisions for the phased decommissioning approach proposed by the core team, (b) the draft technical basis for resolution of major technical issues that are required to implement the core team process in the DEIS, and, (c) the comments developed by the staff on the revised DEIS that include the core team alternative.

#### **Committee Action**

The Committee agreed not to write a letter to the Commission on the Core Team process used at West Valley and the results of the process so far. However, the Committee agreed that they would like briefings commensurate with the three items identified by the DWMEP staff during the briefing to support a Committee letter at a future date.

#### PROPOSED SCHEDULE FOR THE 179<sup>TH</sup> ACNW MEETING

The Committee agreed to consider the following topics during its 179<sup>th</sup> meeting, to be held May 16–17, 2007:

- AREVA Spent Nuclear Fuel Recycle Facilities
- ACNW White Paper on Volcanism
- ACNW Meeting with NRC Commissioner Jeffrey S. Merrifield
- Yucca Mountain Preclosure Repository Design: NRC Staff Review Readiness and Views on the Issues

- Proposed Revision to Standard Review Plan Chapter 11.5 for New Reactor Licensing
- Briefing on Interim Staff Guidance (ISG)-04, "Preclosure Safety Analysis—Human Reliability Analysis"

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• Briefing on Long-Term Research Activities

Sincerely,

/RA/

Michael T. Ryan Chairman

- Proposed Revision to Standard Review Plan Chapter 11.5 for New Reactor Licensing
- Briefing on Interim Staff Guidance (ISG)-04, "Preclosure Safety Analysis—Human Reliability Analysis"

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• Briefing on Long-Term Research Activities

Sincerely,

/RA/

Michael T. Ryan Chairman

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