



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS  
WASHINGTON, D.C. 20555-0001

ACNWS-0176

November 9, 2007

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

Dear Chairman Klein:

SUBJECT: SUMMARY REPORT – 183<sup>rd</sup> MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS, OCTOBER 16-17, 2007, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 183<sup>rd</sup> meeting, October 16-17, 2007, the Advisory Committee on Nuclear Waste and Materials (ACNW&M) discussed several matters.

HIGHLIGHTS OF KEY ISSUES

1. Working Group Meeting on Preclosure Seismic Analysis Evaluation at the Proposed Yucca Mountain, Nevada, Repository

The Committee conducted a 1-day Working Group (WG) Meeting to examine how NRC's seismic design requirements are compared among different licensed nuclear facilities, with special focus given to the use of Title 10, Part 63, "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada [10 CFR Part 63] for the licensing of the proposed Yucca Mountain (YM) repository. The Committee was briefed by NRC staff and other interested stakeholders. As expected, all NRC's regulations bearing on the operation of nuclear facilities require consideration of seismic events in the design of these facilities; however, the regulatory threshold varies by the type of nuclear facility. The reasons for this variation are due primarily to the vintage (or age) of the facility, the relative maturity of seismic engineering science at the time the particular facility was licensed, and the hazard (consequences) of a radiological release by the facility in question.

All NRC regulations strive to achieve a level of seismic performance so that, for a given facility, its structures, systems and components (SSCs) important to safety (ITS) remain in their elastic range of structural performance, thus ensuring that these SSCs continue to perform their intended safety function(s). To ensure that SSCs behave elastically, NRC regulations define a deterministic seismic design basis in terms of some annual probability of exceedance (APE) typically on the order of  $10^{-4}$  events/year. By contrast, Part 63 does not require that a seismic event be evaluated in the context of a single SSC failure. Rather than requiring an event-based consequence analysis, Part 63 requires a sequence-based consequence analysis and the demonstration that a seismic event sequence that would take any SSC ITS outside its elastic range for structural performance is unlikely (specified by regulation to be on the order of  $10^{-6}$ /year).

Because of the differences in regulatory philosophies: APE for an individual SSC vs. seismic event sequence for one or more SSCs, several meeting participants noted that direct comparison of the Part 63 seismic design requirements with other NRC regulations, such as those for nuclear power reactors, is not possible without first performing some type of normalizing study. Part of the difficulty is the non-existence of an analogous Severe Accident Policy Statement for non-reactor facilities to help define “safety” for these facilities. The Office of Nuclear Material Safety and Safeguards (NMSS) staff’s position in Part 63 Integrated Safety Analysis (ISA), based on a seismic event sequence, does not lead to a situation where YM pre-closure surface facilities would need to be designed to the same structural levels required in a nuclear power reactor. The staff noted that, based on the current Department of Energy (DOE) design concept, YM pre-closure surface facility operations are expected to involve a limited number of spent nuclear fuel assemblies, and those assemblies will not be exposed to energy sources typically found in an operating nuclear power plant. Because the radiological risk is likely to be due to routine occupational exposures, the staff expects the YM pre-closure surface facility design to not be unlike a fuel handling facility design currently licensed under 10 CFR Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.”

#### Committee Action

In November, the Committee will be briefed by representatives from DOE about their final proposed design and views on their experience in applying a seismic event sequence design approach to YM pre-closure surface facilities. The Committee plans to write a letter to the Commission on this issue in the December timeframe.

#### 2. NRC’s Total-System Performance Assessment Code for Review of U.S. Department of Energy Performance Assessment of the Yucca Mountain Site

Mr. Bret Leslie and Mr. Christopher Grossman from the Division of High-Level Waste and Repository Safety, and Mr. Osvaldo Pensado and Mr. James Winterle from the Center for Nuclear Waste Regulatory Analyses briefed the Committee on the newly released version of the NRC’s Total-System Performance Assessment (TPA) code, Version 5.1. The presenters described the developmental history and purpose of TPA Version 5.1 and major changes from TPA Version 4.1j. TPA Version 5.1 is a review tool that was developed to assist the NRC staff in conducting preclicensing activities and reviewing a potential DOE license application (LA) for Yucca Mountain (YM). The code provides independent review capability, enhances staff understanding, and supports a risk-informed and performance-based approach. The staff is using the code to help prepare for interactions with DOE such as the October 2007 “Appendix 7” meeting on drifts degradation at YM. The code could be used to update portions of the Risk Insights Baseline Report. NUREG-1804, “Yucca Mountain Review Plan” will guide the use of TPA Version 5.1, consistent with the NRC’s regulatory philosophy.

Primary considerations in the development of TPA Version 5.1 involved the integration of process abstractions for drift degradation, methodology for low-probability seismic event sampling, long-term climate and net infiltration, input parameterization and input/output transparency, and traceability. The staff presented to the Committee details for four other areas

of code revision, which included: (1) Drift Degradation and Seismicity, (2) Near Field Environment and Corrosion Processes, (3) Colloidal Releases, and (4) Volcanic Ash Redistribution Processes.

### Committee Action

The Committee plans to write a letter addressing the staff's presentation regarding TPA code Version 5.1.

#### 3. Draft Proposed Rule/Guidance on Preventing Legacy Sites

Mr. Kevin O'Sullivan and Mr. James Shepherd from the Office of Federal and State Materials and Environmental Management Programs (FSME), and Mr. Thomas Fredrichs from the Office of New Reactors briefed the Committee on proposed changes in NRC regulations for the prevention of decommissioning legacy sites. The Commission is presently reviewing the proposed rulemaking package; therefore, the presentation was limited in scope so as not to discuss predecisional materials in a public meeting. The presenters explained that the changes were intended to address Committee letters dated December 27, 2006, and August 13, 2007. Proposed changes to financial assurance requirements will address the need for more detailed cost reporting and for tighter NRC control of financial instruments. Proposed changes to operations requirements will address the need for improvements in radioactive contaminant release prevention and detection. During the question-and-answer period, the Committee expressed its concern that the proposed rulemaking package does not address remediation of spills and leaks. The staff explained that the implementing guidance is currently under review and would be released with the proposed rule if the Commission approves the rulemaking package as it is. The Committee expressed interest in hearing a presentation on the guidance as soon as possible.

### Committee Action

The Committee agreed to write a letter to the Commission on the proposed rulemaking for the prevention of legacy sites.

#### 4. Mallinckrodt Site Decommissioning Plan

Ms. Lydia Chang from FSME briefed the Committee on the status of the review of the decommissioning plan for the Mallinckrodt, Inc., complex decommissioning site in St. Louis, Missouri. She provided a history of the production at the site that led to the current conditions and explained that the activities resulted in decommissioning work by the licensee for NRC-regulated materials and work by the U.S. Army Corps of Engineers (COE) under the Formerly Utilized Sites Remedial Action Program. She explained which areas of the site require cleanup by the licensee and which require COE cleanup. In addition, she discussed the complications of this division, especially in the Plant 6W area burial trenches. Ms. Chang explained that Mallinckrodt has completed Phase I of its decommissioning which involved building decontamination and demolition, and that the NRC is in the process of review and approval of Phase II, which will address the building foundations, soil, and subsurface contamination.

### Committee Action

The Committee decided not to write a letter to the Commission on the Mallinckrodt decommissioning, but it will include information learned in the briefing in the upcoming decommissioning white paper.

#### 5. Views on the Transportation-Aging-Disposal Performance Specifications

Mr. Christopher Cummings from Holtec International, a commercial dry cask and dual purpose cask vendor, briefed the Committee on Holtec's views on their transportation-aging-disposal (TAD) design that will be used for the transportation to and the disposal of spent nuclear fuel (SNF) and other high-level radioactive waste at the proposed YM repository. Holtec has performed scoping thermal, criticality, shielding and containment analyses for their TAD design. Also just completed is a scoping structural study, including basket stresses, side/end drop and seismic analyses. Holtec suggested DOE to revise the TAD specification in order to allow a variable length canister design. This would enable Holtec to use an existing HI-STORM storage cask with no design changes. Holtec also wants the option to use forced helium dehydration for excess water removal and drying of the canister. Holtec indicated that future modification to the TAD specification may include an underground aging system and higher capacity systems. It was also indicated that DOE needs to provide additional confidence to the TAD concept implementation.

### Committee Action

The Committee plans to remain informed regarding the TAD design issues and the effects upon pre- and post-closure activities at YM.

#### 6. Revision of NUREG-1854, NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations

Ms. Anna Bradford, Ms. Christianne Ridge, and Ms. Karen Pinkston from FSME briefed the Committee on NUREG-1854, "NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations – Draft Final Report For Interim Use" (August 2007). This NUREG is an update to the version issued in May 2006 as NUREG-1854, "Standard Review Plan for Activities Related to U.S. Department of Energy Waste Determinations – Draft Report for Interim Use and Comment." The staff indicated that this revision reflects the comments received from the Committee, DOE, the West Valley Citizen Task Force, the Natural Resources Defense Council, private citizens, and the states of Idaho, New York, Washington, and Oregon, as well as insights obtained from waste determination activities and tasks that they have recently completed. The staff's response and resolution of comments on the Standard review Plan are provided in Appendix C of the updated guidance.

### Committee Action

The Committee agreed to write a letter to the Commission and provide recommendations on the implementation of the NRC's guidance in NUREG-1854 to review waste determination submittals.

PROPOSED SCHEDULE FOR THE 184<sup>th</sup> ACNW&M MEETING

The Committee agreed to consider the following topics during the 184<sup>th</sup> ACNW&M meeting to be held on November 13-15, 2007:

- Drift Degradation – Staff Review Approach and Capability
- ACNW&M November 2007 Briefing to the Commission
- Final Proposed Design for a Geologic Repository at Yucca Mountain, Nevada
- Accounting for Dose Consequence in the State-of-the-Art Reactor Consequence Analysis (SOARCA) Project (Closed meeting)

Sincerely,

**/RA/**

Michael T. Ryan  
Chairman

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Chairman

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