

Incorporate Risk Information into the High-Level Waste Regulatory Framework

NMSS/HLWRS/TRD

Description of Activity:

The Yucca Mountain Review Plan (NUREG-1804, Rev 2, 2003) provides guidance to staff on implementing the risk-informed, performance-based regulations of 10 CFR Part 63. The staff will use the Yucca Mountain Review Plan to ensure that licensing reviews are risk-informed and the proper level of effort is focused on areas important to the safety of the potential geologic repository at Yucca Mountain, Nevada.

The staff completed the risk insights initiative in April 2004 and sent the Commission the Risk Insights Baseline Report. The Risk Insights Baseline Report provides an overall integrated perspective for evaluating the risk significance of repository issues and systems down to the subsystem level, and was subsequently incorporated into the Integrated Issue Resolution Status Report (NUREG-1762). The risk insights are used to focus pre-licensing activities on significant key technical issues. There were 293 agreements with the U.S. Department of Energy related to the key technical issues. These pre-licensing agreements were developed to assure incorporation of sound science into a review of the Yucca Mountain license application. Using this report, the NRC staff finished the evaluation of high-ranked agreements in December 2004. The staff also finished the review of most moderate to low ranked agreements in April 2005. As of the date of that the U.S. Department of Energy tendered the Yucca Mountain license application, June 3, 2008, 269 agreements were complete and 24 needed additional information from the U.S. Department of Energy. Evaluations of the topics addressed in the remaining agreements, if relevant to the license application, will be conducted as part of the license application review.

In addition, the staff developed a License Application Project Plan in December 2004 to guide the process for conducting and documenting the license application review. Staff have used the License Application Project Plan, as revised, along with the Yucca Mountain Review Plan, and the Integrated Issue Resolution Status Report, including incorporated Risk Insights Baseline Report, to guide development of specific review strategies for each of the model abstraction review teams. The staff also used risk insights to develop a risk-informed Yucca Mountain inspection program in September 2005. Staff completed an update to the current total-system performance assessment (TPA) code in June 2007 to facilitate calculations beyond 10,000 years, to incorporate proposed revisions to the regulatory requirements specified in 10 CFR Part 63, and to accommodate a review of potential U.S. Department of Energy design changes. Both the updated code and a detailed user guide for the code, completed in July 2007, have been made publicly available. In the first half of 2008, the staff used the updated TPA code to conduct analyses to support refining the risk insights baseline. Updated risk significance rankings in the Risk Insights Baseline Report were documented in an August 2008 report. The HLW staff has initiated the review of the Yucca Mountain license application; and is now using the Yucca Mountain Review Plan, risk insights baseline, and review team strategies previously developed in conducting a risk-informed review.

Project Considerations: NRC's High-Level Waste program activities and milestones anticipated for Fiscal Year 2008 were affected by external factors such as the timing of a license application for an High-Level Waste repository by the U.S. Department of Energy and uncertainties in the development of revised the U.S. Environmental Protection Agency's radiation protection standards for Yucca Mountain (40 CFR Part 197) as a result of public comment.

Selected Major Milestones and Schedules				
Major Milestones	Original Target Date	Revised Date	Completion Date	NRC Responsibility
Develop HLW inspection procedures using risk insights (complete seven integrated inspection procedures)	September 2004	December 2005	September 2005	NMSS/HLWRS/TRD
Complete risk-informed pre-closure and post-closure key technical issue resolution activities using risk insights	April 2005 [†]	June 2008	June 2008	NMSS/HLWRS/TRD
Develop model abstraction review team strategies using risk insights	September 2006	December 2006	March 2007	NMSS/HLWRS/TRD
Develop Total-system Performance Assessment (TPA) code, Version 5.1	September 2006	June 2007	June 2007	NMSS/HLWRS/TRD

[†] Staff addressed all 293 Key Technical Issue Agreements using risk insights in April 2005 (see description for more detail).