FINAL SUMMARY OF THE
U.S. NUCLEAR REGULATORY COMMISSION AND U.S. DEPARTMENT OF ENERGY
TECHNICAL EXCHANGE AND MANAGEMENT MEETING ON THE
PRECLOSURE SAFETY ANALYSIS AND SUPPORTING INFORMATION
May 16-17, 2006
LAS VEGAS, NEVADA

INTRODUCTION

On May 16 and 17, 2006, the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE) held a public Technical Exchange (TE) and Management Meeting, to discuss the preclosure safety analysis (PCSA) and supporting information. The meeting was held at Bechtel SAIC Company, Conference Room 915, Building 9, in Las Vegas, Nevada. The agenda for this meeting can be found in Enclosure 2.

To support staff and stakeholder interactions, the TE and Management Meeting included video connections at NRC offices in Rockville, Maryland, and at the Center for Nuclear Waste Regulatory Analyses in San Antonio, Texas. Teleconference connections were also made available to interested stakeholders.

Participants included representatives from NRC, DOE, the State of Nevada, Affected Units of Local Government, Nuclear Energy Institute and other industry representatives, and members of the public. Enclosure 3 contains the list of attendees who were present at the above noted locations.

PURPOSE OF THE TECHNICAL EXCHANGE AND MANAGEMENT MEETING

The purpose of this TE and Management Meeting was to discuss the requirements of 10 CFR Part 63, as they relate to the PCSA and supporting information. The discussions focused on several key aspects of the PCSA, including: the PCSA process, the level of information necessary to support NRC's review of the PCSA, and estimating the reliability of structures, systems, and components (SSCs). Enclosure 4 contains the slides presented by NRC and DOE.

NRC KEY MESSAGES

NRC is committed to conducting effective and efficient pre-licensing interactions, with DOE, to facilitate a timely review of a license application. To allow DOE to focus on issues of particular interest to NRC, NRC sent a letter conveying key messages to DOE on May 9, 2006. These key messages provided the framework for discussions during the TE and are listed below:

- 10 CFR Part 63 is a risk-informed and performance-based regulation. Risk insights, engineering analysis and judgment, and performance history may be used to: (1) focus attention on the most important activities; (2) establish objective criteria for evaluating performance; (3) develop measurable parameters for monitoring system and licensee performance; (4) provide flexibility to determine how to meet performance criteria; and (5) focus on the results of the PCSA as the primary basis for regulatory decision-making.

- The PCSA should contain two levels of information: (1) general information on structures, systems, and components (SSCs), equipment, and process activities sufficient to support the PCSA [10 CFR 63.112(a)]; and (2) specific information on the technical bases necessary to demonstrate the ability of important-to-safety (ITS) SSCs to perform their intended safety function or functions [10 CFR 63.112(e)].

- Reliability for SSCs is needed to perform the PCSA and categorize event sequences. There are several approaches for estimating the reliability of SSCs. Accepted engineering practice, including the use of consensus codes and standards, may be used to estimate reliability of SSCs. Empirical data for similar SSCs may also be used to estimate reliability. Modeling may be necessary to estimate reliability if empirical data are limited or unavailable. Regardless of the approach, DOE must provide technical bases for reliability estimates and the approaches used.

- It will be acceptable, when determining reliability estimates, to focus on and commit to SSC analogs at the highest level possible (typically the system level). When direct analogs are not available, it may then be necessary to consider looking at analogs at the component level and provide enough information for the staff to assess the unique SSCs as an aggregate of the components. More design information may be needed to estimate the reliability of unique SSCs.

- PCSA and reliability data need to be related to the design bases and design criteria of the ITS SSCs that are credited with prevention or mitigation of an event sequence. The PCSA must also describe the relationship between design bases, design criteria, and the performance objectives [10 CFR 63.112(f)].

SUMMARY AND CONCLUSIONS

NRC acknowledged that DOE has made significant progress with respect to understanding NRC expectations for the PCSA process and providing information needed to support the PCSA, since the July 2005, “Technical Exchange on Information to Support 10 CFR Part 63 Analyses”. DOE presentations and related discussions indicated that they understood NRC’s key messages and associated staff expectations, presented in the key messages letter dated May 9, 2006. The following discussion highlights important issues discussed during the TE:

- DOE presentations and related discussions recognized that there is a general level of information for SSCs, equipment, and process activities, that is needed to support the staff’s review of the PCSA. DOE also recognized that specific information and technical bases are needed to demonstrate the ability of ITS SSCs to perform their intended safety functions. NRC indicated that the level of information to be presented in the license application, in support of the PCSA, appears to be headed in the right direction, based on the DOE presentations and associated discussion on the level of information.

- NRC and DOE agreed that it is necessary to estimate the reliability of SSCs to conduct the PCSA and to develop and categorize event sequences, as part of the PCSA process. NRC also noted that PCSA, as defined in 10 CFR Part 63, makes no distinction between active and passive SSCs, for the purposes of estimating reliability.

- NRC and DOE agreed that different approaches may be used to estimate the reliability of SSCs, provided that sufficient technical bases are specified.

- NRC indicated that the use of accepted engineering practice, including the use of consensus codes and standards, is a practical method to ensure high confidence in reliability. For performance of the PCSA, DOE must provide a quantification of this high degree of confidence, through the reliability assessment process. NRC indicated that quantification of SSC reliability needs to be sufficient to allow event sequences (based on overall annual frequency) to be categorized as category 1, category 2, or beyond category 2 event sequences. In developing quantitative reliability estimates for an SSC designed using accepted engineering practice, NRC stated that DOE may use empirical performance data associated with a code or similar codes, input from applicable code

committees, or expert opinion from those who have experience in applying a code or using SSCs designed to a code. NRC is not suggesting that DOE validate the consensus codes and standards.

- NRC stated that 10 CFR Part 63 is a risk-informed performance-based regulation, and as such, is focusing on the results of the PCSA and what is important to safety, and is not intended to be more stringent than other regulations.

- NRC and DOE agreed that the reliability assessment for SSCs should be attempted at the highest level possible, typically the system level. If there are insufficient data applicable to a specific level (e.g., system), reliability estimates could be developed using analogous data at the next level down, typically subsystems or individual components. Alternatively, models may be developed to estimate the reliability of system or subsystem by using appropriate information for components. Human reliability, if applicable, should be taken into account.

- NRC and DOE agreed that 10 CFR Part 63 does not specify any minimum expected margin or degree of uncertainty against performance requirements (e.g., threshold frequency between Category 1 and Category 2 event sequences, or between Category 2 and beyond Category 2 event sequences).

- NRC and DOE agreed on the need to schedule future interactions on the following subjects: Preclosure Seismic Safety Basis; Critical Decision 1 (CD-1) Design; the Transport, Aging, and Disposal (TAD) Canister; Technical Specifications; and Human Reliability. This list is not comprehensive and will be updated as appropriate. NRC and DOE should develop tentative schedules for each of these interactions.

- DOE asked for feedback on the acceptability of using a conservative methodology for calculating preclosure consequence analysis, that is supported by appropriate technical justification, to demonstrate compliance with 10 CFR Part 63, including uncertainties. NRC stated that they would provide feedback on this question at a future date.

PUBLIC COMMENT

A representative from the Electric Power Research Institute [Frank Rahn] suggested that DOE may benefit from the use of an approach similar to a Failure Modes and Effects Analysis to systematically identify and screen out potential hazards at Yucca Mountain.

A representative of Clark County [E. Von Tiesenhausen] asked when DOE planned to apply design controls, consistent with the Quality Assurance Requirements Document to the new design being developed as part of the CD-1. DOE indicated that it would provide the schedule after the CD-1 decision has been made later this summer.

COMMITMENTS

The following NRC/DOE commitments were made during the TE and Management Meeting:

1. DOE committed to providing NRC with a summary of the methodology for estimating the reliability of SSCs by August 25, 2006, including examples to illustrate the application of the methodology; and,

2. DOE committed to providing NRC with a copy of the procedure(s) that outline DOE's PCSA process, by July 18, 2006.

/RA/ Date 6/23/06	**/RA/** Date 6/6/06
Mark H. Williams, Director Regulatory Authority Office Office of Civilian Radioactive Waste Management U.S. Department of Energy	Lawrence E. Kokajko, Deputy Director Technical Review Directorate Division of High-Level Waste Repository Safety Office of Nuclear Material Safety and Safeguards U.S. Nuclear Regulatory Commission