

**SUMMARY HIGHLIGHTS OF THE  
U.S. DEPARTMENT OF ENERGY/U.S. NUCLEAR REGULATORY COMMISSION  
TECHNICAL EXCHANGE ON FISCAL YEAR 2003 - 2005  
KEY TECHNICAL ISSUE AGREEMENT RESPONSE APPROACH  
SEPTEMBER 23, 2003  
U. S. NUCLEAR REGULATORY COMMISSION  
ROCKVILLE, MD**

INTRODUCTION

On Tuesday, September 23, 2003, the U.S. Department of Energy (DOE) and U.S. Nuclear Regulatory Commission (NRC) staff conducted a Technical Exchange in Rockville, Maryland, in which DOE presented its integrated approach to resolution of Key Technical Issue (KTI) agreements. The purpose of issue resolution during the pre-licensing period is for DOE to assure that it has assembled enough information on a given issue for NRC to accept a license application for review. The additional work planned by DOE covers information that NRC staff expects would be needed during the review of a license application (if submitted) to dispose of high-level radioactive waste at Yucca Mountain, Nevada, in accordance with the requirements of 10 CFR Part 63.

The detailed agenda for this meeting can be found in Attachment 1. The Technical Exchange included a video conference at DOE in Las Vegas, Nevada, and the Center for Nuclear Waste Regulatory Analyses in San Antonio, Texas. In addition to staff from DOE, NRC, the Center for Nuclear Waste Regulatory Analyses and DOE's contractors, the meeting was attended by representatives from the State of Nevada; Lincoln County, Nevada; Nevada Nuclear Waste Task Force; and the public. Attachment 2 contains the list of attendees who were present at the conference locations.

OPENING REMARKS

The meeting commenced with opening remarks by DOE and NRC. DOE indicated that the purpose of the technical exchange was to discuss the revised integrated and systematic strategy for resolution of KTI agreements. DOE emphasized that every agreement will be explicitly addressed. In its opening remarks the NRC stated that while NRC is interested in DOE's detailed discussion of the grouping methodology and content of the Technical Basis Documents and Appendices, the NRC focus is on addressing KTI agreements and DOE's supporting technical basis, not the DOE approach. NRC also stated that NRC was interested in being informed if the schedule for DOE submittals had changed from that provided by DOE on June 23, 2003, and whether there had been any changes in the grouping.

Steve Frishman, representing the State of Nevada, stated that based upon the NRC's November 13, 2001, sufficiency letter, it seems that the KTI agreements should be "complete" in lieu of "addressed" prior to DOE's submittal of the license application. He questioned the NRC regarding how the NRC will treat KTI agreements for which DOE has a plan for completion after submittal of the license application—would these agreements be managed under the performance confirmation program or a research and development program? NRC responded to these remarks later in the meeting.

## PRESENTATIONS AND DISCUSSION

The DOE presented its approach to resolution of grouped KTI agreements, including the integrated technical basis approach and an overview of a sample of the contents of the Saturated Zone Flow and Transport technical basis report and appendices addressing associated KTI agreements. The presentations included discussions on:

- U.S. Department of Energy Approach to Grouped Resolution of KTI Agreements
- Development of Technical Basis Documents for Postclosure Performance Assessment, and
- Example Development of Technical Basis Documents for Postclosure Performance Assessment—Saturated Zone Flow and Transport

The DOE presentation's can be found in Attachment 3.

### U.S. Department of Energy Approach to Grouped Resolution of KTI Agreements

The DOE explained that revisions to the resolution strategy for KTI agreements were needed. The previous approach focused primarily on responses to individual agreements. The revised approach addresses the KTI agreements according to their relationship to the repository system, consistent with the Yucca Mountain Review Plan and development of the Safety Analysis Report. The DOE believes that this approach results in a more integrated, systematic approach to address KTI agreements. One hundred-ninety four KTI agreements and NRC additional information needs (AINs) have been mapped to logical groupings for which Technical Basis Documents will be prepared. Grouped KTI agreement response deliveries will begin in the Fall of 2003 and continue through 2004. Remaining KTI agreements not associated with postclosure processes will be responded to individually and submitted in parallel with grouped KTI agreements and AINs through mid-2004.

Individual KTI agreements and AIN responses are being directly addressed in Appendices to the Technical Basis Documents. Each Technical Basis Document will provide the broad context of postclosure repository performance to which the KTI responses relate. The Technical Basis Documents will contain a detailed scientific bases discussion with a focus on physical processes and phenomena. The Technical Basis Documents provide for integration of data, parameters, and models related to components of the postclosure performance assessment. Detailed Technical Basis Document text will provide the overall context for comprehensive discussion in the corresponding KTI agreement appendix. In addition, the appendices will provide references to information provided in the Technical Basis Documents. Some sub-grouping of identical or closely related KTI agreements will be handled in a single appendix.

Irrespective of the NRC's risk-ranking, DOE will provide all relevant information available at the time the Technical Basis Document is prepared. That is, DOE will not provide less information for low-risk ranked agreements when more information is available.

All KTI agreements are to be addressed by the time the License Application (LA) is submitted. DOE will provide NRC with a plan for resolution of those agreements where information is not expected to be available to resolve the agreement until after LA submittal; this plan is to be

provided to the NRC about six months prior to LA submittal, in the summer of 2004. This plan will provide the development status of final resolution and will describe DOE's basis for acceptability of an interim status to support NRC's LA technical adequacy review.

The DOE provided a schedule for KTI agreement responses for the remainder of FY 03 through FY 05 and stated that the KTI agreement response schedule will be aggressively managed to assure earliest practical delivery of information addressing NRC's needs. DOE also noted that the Technical Basis Documents are broadly written to envelop future work. Currently there are no plans to update the Technical Basis Documents; however, DOE recognizes that significant changes to DOE's technical understanding of the repository system may warrant future notification to the NRC and updating or revising the responses to individual KTI agreement responses or Technical Basis Documents.

The NRC questioned whether or not Technical Basis Documents would be developed for pre-closure related KTI agreements. DOE responded that Technical Basis Documents would only address pre-closure to the extent aspects of pre-closure support KTI agreement responses, such as drift degradation and seismic design bases. DOE does not intend to develop stand-alone Technical Basis Documents for pre-closure. The NRC also questioned the relationship between several grouped and ungrouped KTI agreements associated with related technical areas, such as waste package and seepage. DOE indicated that there were several KTI agreements for which responses were developed prior to grouping KTI agreements. In these cases, DOE elected not to include these agreements in the associated group. These KTI agreements will be responded to in separate submittals.

NRC questioned DOE regarding the use of preliminary information in the development of the Technical Basis Documents and whether DOE will revise the information supporting the agreement responses. DOE stated that they will revise the agreement responses if new information indicates a change is needed; however, the Technical Basis Document may or may be revised depending upon the nature of the deviation from what was previously provided.

#### Development of Technical Basis Documents for Postclosure Performance Assessment

DOE stated that it performed its scientific and engineering work (design, testing, model refinement and validation, and analyses) with a focus on addressing KTI agreements. This work has been documented in scientific notebooks/data analysis, analysis/model reports, and calculations and drawings. This work has been utilized to assess repository postclosure performance. This work is being abstracted from the technical work products into integrated Technical Basis Documents.

DOE is producing fourteen Technical Basis Documents:

- I. Climate and infiltration
- II. Unsaturated zone flow
- III. Water seeping into drifts (including thermal effects on water flow)
- IV. Mechanical degradation and seismic effects
- V. In-drift chemical environment (including thermal effects on water flow and chemistry, evaporation effects on in-drift water flow and chemistry, and chemistry modification by dust and deliquescence)

- VI. Waste package and drip shield corrosion (including degradation of the drip shield and degradation of the waste package)
- VII. In-package environment, waste form degradation and solubility (including water and chemistry evolution in the waste package, degradation of the waste form, and mobilization of radionuclides)
- VIII. Colloid transport (including mobilization of radionuclides, transport to edge of the waste package, transport to the invert, transport to rock, unsaturated zone transport, and saturated zone flow and transport)
- IX. Engineered barrier system transport (including thermal effects on water flow and chemistry, transport to the edge of the waste package, transport to the invert, and transport to rock)
- X. Unsaturated zone transport (including thermal effects on transport)
- XI. Saturated zone flow and transport
- XII. Biosphere transport
- XIII. Volcanic events
- XIV. Low probability seismic events

#### Scope and Content of Technical Basis Documents

The Technical Basis Documents will summarize key processes and, as appropriate, relevant features and events for the 14 components of the postclosure repository performance. They will describe the relevance of these processes to performance assessment and summarize key information used as the basis for conceptual understanding. Present models are used to support development of abstractions used in performance assessment. The documents will summarize information used as a basis for parameters within models and summarize key results of model abstractions. The documents will introduce appendices where individual (or grouped) KTI agreement responses are presented.

Each Technical Basis Document will contain an introduction to the processes considered and provides their relationship to performance and other processes. The documents will describe the processes and related models and provide a summary of information forming the basis for process and model understanding. The documents will also provide a summary of information forming the basis of parameter development and discuss parameter and model uncertainty. Finally the documents will provide a summary of model results (e.g., abstractions) relevant to performance assessment.

#### Discussion of U.S. Department of Energy Approach to Grouped Resolution of KTI Agreements and Development of Technical Basis Documents for Postclosure Performance Assessment

The NRC questioned whether DOE would make available to the NRC the documents referenced in the Technical Basis Documents and Appendices. DOE indicated it was not feasible to make all references available because of the large number of these documents. DOE added that the Technical Basis Documents and Appendices were intended to provide sufficient information such that they are stand alone. DOE noted that if the NRC had a specific need for a reference, then DOE would provide the specific information.

## Example Development of Technical Basis Documents for Postclosure Performance Assessment–Saturated Zone Flow and Transport

DOE presented an outline of the Saturated Zone Flow and Transport Technical Basis Document and the associated appendices which address individual KTI agreements. The content of the document was discussed in detail including a description of the key processes; regional groundwater flow; site-scale groundwater flow; advection, matrix diffusion and dispersion; radionuclide retardation; and major results.

DOE stated that the Saturated Zone Flow and Transport Technical Basis Document typifies the general structure and content of all Technical Basis Documents. Each document will present the relevant processes and summarize the major data sources used to describe those processes. Each document will present the most significant parameters and their uncertainty. Each document will present the major abstractions that are used in the postclosure performance assessment.

### CLOSING REMARKS

NRC stated that it appreciated DOE's forward-looking approach for submittal of KTI agreement responses and stated that the overall approach is reasonable and provided a deeper level of insight. NRC, however, expressed concern regarding issues of timing and sequencing of information to be included in some KTI agreement responses.

### PUBLIC COMMENTS

There was opportunity for questions and comments during the presentations as well as at the completion of formal presentations.

Susan Lynch, representing the State of Nevada, requested clarification regarding DOE's QA reviews of the Technical Basis Documents and the Appendices. DOE indicated that no reviews were performed by the QA organization; however, project procedures were used to conduct document checks and technical and regulatory reviews similar to the reviews for other documents submitted to the NRC.

Charlie Fitzpatrick, representing the State of Nevada, asked why DOE doesn't wait until all KTI agreements are closed before submitting the license application. In response, DOE stated that the LA is on schedule for submittal to the NRC in December, 2004. DOE will address the KTI agreements by the time of LA submittal; however, submittal of the LA is not contingent on closure of all the KTI agreements. The NRC, in response to Mr. Fitzpatrick's concerns, referred to Margaret Federline's remarks at the July 2003 NRC/DOE Management Meeting and stated that NRC recognizes that it is the DOE's responsibility to address all agreements prior to license application submittal. NRC will review DOE's plans for providing a complete response and determine the acceptability of the approach. Providing supplemental information after submittal of the License application is consistent with 10 CFR 63 and consistent with the requirement to keep the license application updated.

