



U.S. Department of Energy  
Office of Civilian Radioactive Waste Management

# Objectives of Technical Exchange on Yucca Mountain TSPA-SR

Presented to:  
**NRC/DOE TSPA-SR Technical Exchange**  
**San Antonio, Texas**

Presented by:  
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YUCCA  
MOUNTAIN  
PROJECT

# DOE Approach to Issue Resolution

- **DOE is committed to an approach to resolution in the context of NRC's risk-informed, performance-based method**
- **Issues will continue to be addressed through formal interactions and correspondence**
- **Issues will be tracked using a database to ensure that all issues are ultimately addressed**

# Objective of TSPA Key Technical Issue

- **Outline the elements of an acceptable methodology and approach for conducting assessments of repository performance to demonstrate compliance with total-system performance and multiple barrier requirements**

# Subissues Supporting the TSPA KTI Objective

KTI SUB-ISSUES	IMPORTANCE TO WASTE ISOLATION
<b>1 System Description and Demonstration of Multiple Barriers</b>	<b>Demonstrates the effectiveness and diversity of the barriers as a measure of the resiliency of the repository and describes transparency and traceability</b>
<b>2 Scenario Analysis</b>	<b>Describes what can reasonably happen to the repository and the processes and events that can affect the system</b>
<b>3 Model Abstraction</b>	<b>Provides for a systematic examination, in the context of the total system performance, whether models, assumptions, and input data have been appropriately identified, incorporated and analyzed in the TSPA-SR</b>
<b>4 Demonstration of the Overall Performance Objective</b>	<b>Provides for a transparent demonstration of compliance with the overall performance objective</b>

# **TSPAI Subissues Addressed in this Technical Exchange**

## **Subissue 1 - System Description and Demonstration of Multiple Barriers**

<b>TSPA documentation style, structure, organization</b>	<b>TSPA-SR</b>	<b>McNeish</b>
<b>Code Design and Data Flow</b>	<b>TSPA-SR Model</b>	<b>Sevougian</b>
<b>Demonstration of Multiple Barriers</b>	<b>DOE Approach to Multiple Barriers</b>	<b>Andrews</b>
<b>FEPs Identification and Screening</b>	<b>FEPs Approach, Process, and Methodology</b>	<b>Swift</b>

# TSPAI Subissues Addressed in this Technical Exchange

## Subissue 2 - Scenario Analysis

<b>Identification of initial set of processes and events data</b>	<b>FEPs Approach, Process, and Methodology</b>	<b>Swift</b>
<b>Classification of processes and events</b>	<b>FEPs Approach, Process, and Methodology</b>	<b>Swift</b>
<b>Screening of scenario classes</b>	<b>FEPs Approach, Process, and Methodology</b>	<b>Swift</b>
<b>Formation of scenarios</b>	<b>FEPs Approach, Process, and Methodology</b>	<b>Swift</b>

# **TSPAI Subissues Addressed in this Technical Exchange**

## **Subissue 3 - Model Abstraction**

<b>Spatial and temporal distribution of flow</b>  <b>Flow paths in the unsaturated zone</b>  <b>Radionuclide transport in the unsaturated zone</b>	<b>Unsaturated Zone Flow and Transport</b>	<b>Wilson</b>
<b>Quantity and chemistry of water contacting waste packages and waste forms</b>	<b>Engineered Barrier System:</b>  <b>Thermal hydrology and Near-Field Host Rock Chemical Environment</b>  <b>Chemical Environments and Transport</b>	<b>Francis</b>  <b>Nowak</b>

# TSPAI Subissues Addressed in this Technical Exchange

## Subissue 3 - Model Abstraction

<b>Engineered barrier degradation</b>	<b>Waste Package and Drip Shield Degradation</b>	<b>Lee</b>
<b>Radionuclide release rates and solubility limits</b>	<b>Waste Form Degradation Model</b>	<b>Rechard</b>
<b>Flow paths in the saturated zone</b> <b>Radionuclide transport in the saturated zone</b> <b>Dilution of radionuclides due to well pumping</b> <b>Lifestyle of the critical group</b>	<b>Saturated Zone Flow and Transport / Biosphere</b>	<b>Arnold</b>



# TSPAI Subissues Addressed in this Technical Exchange

## Subissue 3 - Model Abstraction

<b>Mechanical disruption of engineered barriers</b> <b>Volcanic disruption of waste packages</b> <b>Airborne transport of radionuclides</b> <b>Redistribution of radionuclides in soil</b>	<b>Disruptive Events</b>	<b>Sauer</b>
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# TSPAI Subissues Addressed in Subsequent Technical Exchanges

- **SUBISSUE 1 - System Description and Demonstration of Multiple Barriers**
  - Abstraction Methodology
  - Data Use and Validity
  - Assessment Results
- **SUBISSUE 2 - Scenario Analysis**
  - Screening of Processes and Events

# TSPAI Subissues Addressed in Subsequent Technical Exchanges

- **SUBISSUE 3 - Model Abstraction**
  - Generic Acceptance Criteria
  - Engineered Barrier Degradation
  - Mechanical Disruption of Engineered Barriers
  - Quantity and Chemistry of Water Contacting WPs and WFs
  - Radionuclide Release Rates and Solubility Limits
  - Spatial and Temporal Distribution of Flow
  - Flow Paths in the Unsaturated Zone
  - Radionuclide Transport in the Unsaturated Zone
  - Flow Paths in the Saturated Zone
  - Radionuclide Transport in the Saturated Zone

# **TSPAI Subissues Addressed in Subsequent Technical Exchanges**

- **SUBISSUE 3 - Model Abstraction (continued)**
  - Volcanic Disruption of Waste Packages
  - Airborne Transport of Radionuclides
  - Dilution of Radionuclides Due to Well Pumping
  - Redistribution of Radionuclides in Soil
  - Lifestyle of the Critical Group
- **SUBISSUE 4 - Demonstration of the Overall Performance Objective**

# Tentative Schedule for Process Model Report (PMR) Interactions

<b>7/12-13/00</b>	<b>Unsaturated Zone Flow and Transport</b>
<b>7/18/00</b>	<b>Disruptive Events - Seismic</b>
<b>7/27/00</b>	<b>Saturated Zone Flow and Transport</b>
<b>8/29/00</b>	<b>Biosphere</b>
<b>8/30-31/00</b>	<b>Disruptive Events - Igneous</b>
<b>9/7/00</b>	<b>- EBS Degradation, Flow, and Transport - Near-Field Environment</b>
<b>10/12/00</b>	<b>- Waste Package - Waste Form</b>