

# **Used Fuel Disposition Campaign**

## **Deep Borehole Disposal (DBD) Session Summary**

**Geoff Freeze  
Sandia National Laboratories**

**UFD Working Group Meeting  
Las Vegas, NV  
June 9, 2016**

# Deep Borehole Disposal (DBD) Breakout Sessions

## SESSION 1 - WEDNESDAY, JUNE 8, 2016: 08:00 AM – 09:50 AM

Time	Presenter	Topic
08:00 – 08:10	Tim Gunter (DOE)	DBFT Overview and Status
08:20 – 08:30	Geoff Freeze (SNL)	DBD Safety Case Framework
08:30 – 08:45	Dave Sassani (SNL)	DBFT Site Evaluation and Site Selection
08:45 – 09:00	Frank Perry (LANL)	Geologic Framework Model
09:00 – 09:05	Glenn Russell (INL)	Regional Geology Web Map Application
09:05 – 09:20	Emily Stein (SNL)	DBD PA Model
09:20 – 09:30	Kris Kuhlman (SNL)	DBFT Borehole Characterization
09:30 – 09:35	Kurt Nihei (LBNL)	Monitoring and Characterization
<b>09:35 – 09:50</b>	<b>Group Discussion</b>	<b>Siting and Characterization</b>

## SESSION 2 - WEDNESDAY, JUNE 8, 2016: 10:10 AM – 12:00 NOON

Time	Presenter	Topic
10:10 – 10:30	Ernie Hardin (SNL)	DBFT Engineering Overview
10:30 – 10:40	Fred Peretz (ORNL)	Surface Handling and Transfer Cask Concept
10:40 – 10:50	John Cochran (SNL)	Emplacement Zone Completion Options
<b>10:50 – 11:10</b>	<b>Group Discussion</b>	<b>Engineering</b>
11:10 – 11:20	Jonny Rutqvist (LBNL)	DRZ Modeling and Testing
11:20 – 11:30	Pat Dobson (LBNL)	Swedish Deep Borehole R&D
11:30 – 11:40	Florie Caporuscio (LANL)	Laboratory Testing of Sealing Materials
11:45 – 11:50	T.J. Ulrich (LANL)	DRZ and Fracture Detection
11:50 – 11:55	Andrew Delorey (LANL)	Stresses and Breakouts

## DBD and DBFT Overview

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### ■ UFD is conducting a Deep Borehole Field Test (DBFT)

- To demonstrate and evaluate technologies necessary for determining the safety and feasibility of the deep borehole disposal (DBD) concept
- Currently working with Spink County SD

### ■ DBD R&D is ongoing

- Borehole testing and characterization methods
  - *properties of low-k crystalline rock, DRZ, and deep, high-T brines*
- Geologic framework model
- Engineering design
  - *deep drilling*
  - *waste packages*
  - *surface handling and emplacement system*
- PA model

## DBD Safety Case – Current Status for Cs/Sr Disposal

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### ■ Pre-Closure Safety Case for Deep Borehole Disposal of Cs/Sr:

- **Drilling** and casing a large diameter borehole to 5,000 m depth in crystalline basement rock is achievable with existing drilling technology.
- **Surface handling and emplacement systems** can be engineered to provide a high level of assurance that waste packages can be safely emplaced at the desired depth with minimal probability of packages becoming stuck and/or breached.
- Additional hazard analyses needed for: transportation, worker exposure, surface handling, and external events (e.g., seismic, flooding, sabotage)

### ■ Post-Closure Safety Case for Deep Borehole Disposal of Cs/Sr:

- Waste emplacement is deep; in **low-permeability crystalline basement rock** with limited interaction with shallower groundwater.
- **Borehole seals** can be engineered to maintain their physical integrity, at least over the approximately 100-year time period of thermally-induced upward groundwater flow.
- Preliminary results from post-closure PA calculations suggest **minimal radionuclide releases** beyond the disposal zone and zero dose at biosphere.