

YUCCA
MOUNTAIN
PROJECT

Studies

Site Program Activities Addressing Key SZ Issues

Presented to:
Nuclear Waste Technical Review Board

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Key SZ Issues

- **Expert-elicitation panel was asked to assess these specific SZ flow and transport issues:**
 - **Conceptualization of SZ flow**
 - **Large hydraulic gradient**
 - **Ground-water flux beneath Yucca Mountain**
 - **Influence of climate change**
 - **Conceptual models of SZ transport**
 - **Dilution factor/dispersivity**
 - **Effective fracture density**
 - **Hydrochemical transport parameters**

Conceptualization of SZ Flow

- **Refine conceptual models of regional and site ground-water flow systems through:**
 - **Additional collection of field data**
 - **Heuristic modeling of ground-water flow and tracer movement to test hypotheses**

Large Hydraulic Gradient

- **Boreholes G-2, WT-24, and WT-18**
 - **Hydraulic testing**
 - **Geophysical logging**
 - **Core analysis**
- **Ground-water flow modeling to test conceptualizations**

Flux Beneath Yucca Mountain

- **Refine potentiometric gradient**
 - **Boreholes WT-24 and SD-6**
- **Determine hydraulic conductivity**
 - **Hydraulic testing at C-Wells and at planned Second Testing Complex (STC)**
- **Ground-water flow modeling to calculate flux magnitude and direction as functions of space and time**

Influence of Climate Change

- **Bound estimates of long-term climate change (10 - 100 ky) based on Owens Lake core analysis**
- **Evaluation of modern and past ground-water discharge sites**
- **UZ/SZ calcite morphology/geochemistry**
- **Ground-water flow modeling with increased recharge rates**

Conceptual Models of SZ Transport

- **Ground-water isotope geochemistry**
- **Application of heuristic transport modeling capability to test flow and transport pathway conceptualizations**
- **Refine computational grid of site-scale SZ flow and transport model**

Dilution Factor/Dispersivity

- **Tracer testing**
 - **C-Wells and STC**
- **Ground-water isotope geochemistry**
- **Heuristic transport modeling and sensitivity analyses**

Effective Fracture Density

- **Hydraulic testing and flow surveys**
 - C-Wells and STC
- **Transfer of ESF fracture mapping data**
 - Distributed fracture density in TSw unit
 - Discrete fracture zones, e.g., associated with faults

Hydrochemical Transport Parameters

- **Tracer Testing**
 - C-Wells and STC
- **Field determinations of ground-water oxidation state**
- **Laboratory evaluations of**
 - Radionuclide solubilities
 - Effective K_d 's
 - Colloidal facilitated transport

Summary and Conclusions

- **Ongoing and planned SZ testing and modeling activities are targeted on reducing uncertainty associated with the identified key SZ flow and transport issues**