Site Program Activities Addressing Key SZ Issues

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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.