Update:
Yucca Mountain Site Characterization Office

Presentation to:
Nuclear Waste Technical Review Board (NWTRB)

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Topics for Discussion

- Planned work in FY 1999 and FY 2000
- Site Recommendation Decision Process
- Technical Integration to support SR and LA
Milestones

Site Characterization

Performance Assessment

Science and Engineering

Exploration

1998
Draft Environmental Impact Statement
Viability Assessment

1999
Environmental Impact Statement

2000

2001

Site Recommendation

2002
License Application

*If Yucca Mountain is found suitable

2005
Construction Authorization

2010
Waste Emplacement

2002
*Enhanced Characterization Repository Block Drift

2005
*Independent NRC Review Process

2010
*NORTH PORTAL

SOUTH PORTAL
Major Products for FY 1999

- Issued the VA - December, 1998
- Completed and released the TSPA-VA Technical Basis Report - December 1998
- Completed and released the Site Description Document - January 1999
  - Complete design alternatives activity and select SR/LA design concept - July 1999
  - Publish NOA for Draft Environmental Impact Statement - July 1999
Next Steps - A Look Ahead

• Project has shifted from focusing on the VA to focusing on the EIS and Site Recommendation process

• We are developing a comprehensive plan that
  – Leads to a final environmental impact statement in 2000
  – Provides sufficient information for a defensible evaluation of suitability in 2001, and if suitable;
  – Can support a recommendation to the President that DOE proceed with submitting a license application to the NRC for construction of a geologic repository in 2002
Design Selection

• Design alternatives and options have been assessed and DOE will select a single design concept for the Site Recommendation and LA

• The goal of the design concept is to:
  – Support assessments of preclosure and postclosure system performance
  – Be integrated with and complement the natural barriers
  – Provide required defense-in-depth through multiple barriers
Reprioritization of Technical Work for SR and LA

- In the VA volume 4, table 2-2 identified the principal factors of repository performance and prioritized information needs.

- A preliminary reprioritization has begun using alternative design concepts and technical information obtained since VA.

- The alternative design concepts will introduce some additional factors important to performance related to the drip shield and the saturated zone, and changes the relative importance of other factors.
Reoprioritization of Technical Work for SR and LA

• The four key attributes of the Repository Safety Strategy remain the same;
  – limited water contacting the waste package
  – long waste package life
  – low rate of radionuclide release
  – concentration reduction along flow paths

• Reprioritization will be completed to support FY 2000 planning after the SR/LA design is selected
Key Design Activities in FY 2000

• Develop process models and information feeds used as the basis for TSPA abstractions
• Continue materials testing and analysis for waste package and waste form
• Development and maintenance of requirements for MGR systems
• Develop necessary design products to support the SR
Key Planned Scientific Investigations in FY 2000

• ESF and Cross-drift testing
  – Continue bomb-pulse Cl-36 validation: Systematic analysis of rock samples for Cl-36, H-3, C-14 and Tc
  – Ambient moisture distribution/ventilation effects in the ESF and Cross-drift
  – Hydrologic and rock properties test in the Cross drift
  – Solitario Canyon Fault tests
  – Seepage and fracture–matrix interaction tests in the ESF
  – Drift-scale thermal test in the ESF

• Volcanic/alluvial aquifer testing complex
  – tracer and hydrologic tests coordinated with Nye County
Site Characterization

• Site characterization formally ends with the Secretary’s decision whether or not to recommend that the President approve the site.

• Performance confirmation, which begins during site characterization, will continue until repository closure.
  – Performance confirmation tests, experiments, and analyses will focus on evaluating the accuracy and adequacy of the information used to determine that the NRC’s postclosure performance objectives will be met.

• Research and development testing may also be conducted to confirm the adequacy of design and to resolve any remaining concerns.
Site Recommendation Decision Process

- Site Recommendation Consideration Report - in 11/00
- Public Comment Period and Consideration Hearings - beginning in 11/00
- Site Recommendation Report (draft) - in 04/01
- Site Recommendation decision by the Secretary of Energy - in 06/01
Site Recommendation Decision Process
(continued)

• Site Recommendation Consideration Report will be completed in 11/00 for SR Consideration Hearings and public comment
  – Volume 1: Summary of technical information required by Section 114 of the NWPA
    » Description of the proposed repository design and waste form or packaging
    » Discussion of data obtained in site characterization… relating to the safety of the site
    » Summary of TSPA-SR rev. 0
– Volume 2: Preliminary Suitability evaluation based on TSPA-SR rev. 0 includes

  » Technical conclusions compared to the regulations in place at that time

  » Focus on the postclosure performance of a geologic repository at Yucca Mountain

  » A preliminary preclosure safety evaluation of repository facilities using preliminary engineering specifications
Site Recommendation Decision Process
(continued)

• Site Recommendation consideration hearings and public comment period
  – public comment period on the SR Consideration Report is planned for 11/13/00 to 1/12/01
  – public hearings in 12/00 (at least two locations) near the site as required by sec 114 of the NWPA

• Site Recommendation Report (draft) will be completed in 04/01 after considering public comments
  – revised technical content in volumes 1 and 2 after considering public comments
  – TSPA-SR rev. 1 will provide basis for suitability evaluation in volume 2
  – Findings relative to the siting guidelines will be included in volume 2
Site Recommendation Decision Process
(continued)

- Site Recommendation decision by the Secretary of Energy in 06/01 will be based on the information required by the NWPA:
  - Final EIS
  - Site Recommendation Report (Volumes 1 & 2)
  - the views and comments of the Governor and legislature of any state and responses of the Secretary of Energy
  - Preliminary comments from the NRC on sufficiency of information for inclusion in a license application
    » site characterization analysis
    » waste form proposal
  - Other information the Secretary of Energy considers appropriate
Adequacy of Information

• Information is adequate for evaluating compliance with regulatory requirements when:
  – A defensible compliance position can be demonstrated through:
    » Transparent and traceable TSPA,
    » Corroborative site characterization data and observations, including analogue studies,
    » Defensible demonstration that individual natural and engineered barriers will perform as expected
  – The compliance arguments can pass a credibility test from technical experts, regulatory and legal specialists, and policy and decision makers
  – It is unlikely that new information will change conclusions about repository performance
Technical Integration to Support SR and LA

- SR and LA will require documentation which is
  - Defensible through technical rigor, and
  - Defensible through documentation of the processes used

- After self assessments, DOE is improving traceability of documentation using a top-down approach
  - Process Model Reports, supported by
    » Analysis and Model Reports, supported by
      † Qualified data, codes and models and other info
  - System Description Documents supporting design

- Developing technical documentation using a controlled set of data and models will provide a defensible evaluation of compliance
Process Model Report Logic

- Hydrologic Properties Data
- Borehole Porosities
- XRD Mineral Data
- Regional Potentiometric Surface
- Mapping, Geologic Data
- Surface & Borehole Geophysics
- Stratigraphic Workbook
- Geologic Framework Analysis & Model Report
- Rock Properties Analysis & Model Report
- ISM 3.1 Process Model Report
- 3D Min Model Analysis & Model Report
- Other Process Model Reports
- Environmental Impact Statement
- Site Recommendation Report
- License Application
- Total System Performance Assessment

Integrated Site Model Milestone Flow Chart
Technical Integration to Support SR and LA
(continued)

- Process Model Reports are the equivalent of the TSPA Technical Basis Report prepared in support of the TSPA-VA
- The TSPA is the primary tool for integrating scientific and design information for post-closure performance
  - Analysis and Model Report information is combined with LA Design Selection results to support TSPA
  - Technical and regulatory conclusions are supported with:
    » Corroborative measurements and observations
    » Natural and anthropogenic analogues
    » Peer reviews and expert elicitations
• System Description Documents (SDDs) are used to define the requirements for the repository design

• SDDs will provide a demonstration of compliance with repository requirements on a system by system basis

• SDDs form the basis for the description of the repository in the Site Recommendation Report and are the basis for the preliminary engineering specifications
Summary

• Work scheduled in the remainder of FY 99 and planned for FY 2000 is intended to produce a well documented Site Recommendation Consideration Report for public review in November 2000