Yucca Mountain Site Operations Update

Presented to:
Nuclear Waste Technical Review Board

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Presentation Outline

- Site facilities and infrastructure description
- Background/history
- Exploratory Studies Facility (ESF) facilities current condition and proposed improvement plan
- ESF underground systems current condition and improvement plan
- Support utilities (water, roads, power, communication) current condition and improvement plan
Yucca Mountain Site Facilities and Infrastructure

- Site facilities and infrastructures include:
  - Approximately eight miles of ESF tunnel and support utilities systems (water, power, sewer, ventilation, communication, fire detection and alarm system, underground rail transportation, etc.)
  - Facilities at both ESF north and south portals
  - Site support utilities (water, roads, power, etc.)
  - Central support area facilities (sample management facility, fueling station)
  - Boreholes, trenches, test facilities
General Condition of Site Infrastructure

- **Background**
  - Field activities and tunnel construction occurred from 1993 to 1998
  - Expected time of use of the facilities was 5 to 10 years
  - As-constructed configuration favored over designed systems and structures
  - Existing Nevada Test Site utilities (electric power, water), infrastructure (roads, buildings) used without upgrades
Underground Layout
General Site Infrastructure Condition  
(Continued)

- **Current outlook**
  - Site current mission to extend for another 5+ years for a total life of 15+ years
  - Systems are aging and degrading
  - System documentation detail varies

- **Risk management approach**
  - Assessments were conducted on each system in 2004-2005
  - System routine and preventative maintenance prioritized
  - Safety mitigations instituted to ensure safe envelope of operations
Current ESF Site Facilities

North portal facilities

- Two permanent structures
- 121 temporary structures
  - Trailers
  - Cargo containers
  - Tents (fabric covered)
- About 185 full time employees
ESF Site Facilities - Current Condition

- Warehouse and craft metal fabrication functions located in tent structures on the north portal pad
- Other craft activities performed under corrugated metal sunshades
- Craft work environment not climate controlled
- Aged and deteriorating office space for staff
- 45-minute minimum response time for fire & rescue services
Lower Muck Yard Complex - Proposed Plan

- Draft Environmental Assessment examines alternatives to relocate ESF warehouse and craft shops to proposed structures adjacent to the north portal pad on previously disturbed land.

- Proposed Action Considers:
  - Construct and equip new medical and fire station (8,000 ft²), and heavy equipment maintenance shop (8,000 ft²).
  - Construct craft, warehouse, and administrative facility (approx. 30,000 ft² each).
Current Condition of Underground Rail System

- ESF rail installed from 1993 to 1998
- As-constructed condition did not secure gauge
- Use has resulted in broken joint plates and increasing rail maintenance

To address rail condition the DOE has:
- Conducted detailed assessments in 2000 and 2004
- Developed and implemented rail and rolling stock maintenance programs and rail inspector qualifications
- Implemented additional rail speed mitigations (currently 5 mph)
Underground Electrical System – Mine Power Centers (MPC)

- Preventive maintenance completed in FY 2005
- Back panels still inaccessible for repairs
- Clearance issues with trains in tunnel
  - Speed restrictions in proximity to MPC platforms
Underground Fire Alarm and Detection System

- Serves as a means of detecting underground fire, providing notification to personnel
- Need identified in a 2004 fire hazards analysis
- Satisfies the requirements of National Fire Protection Association 72 and 502
- Installation completed in North Ramp, ECRB* and Alcove 5
- Remaining sections of system will be installed in 2008

* ECRB = Cross drift for enhanced characterization of the repository block
Underground Lighting Upgrade

- Based on results of an independent assessment, recommendations made to complete modifications to the lighting system and implement a maintenance/repair program
- System repair completed to Alcove 6
- Installation will be completed conjunction with Fire Detection System
Underground Ventilation Improvements

- A 2004 assessment recommended modifications to the ventilation system and implementation of a maintenance/repair program
- Temperature and vibration monitors installed on fans
- Fan 10 and 11 planned for replacement
Ground Support

- System assessed in 2004
- Implemented additional ground support controls in certain areas
- Implemented a rockbolt maintenance program
- 2004 Fire Hazard Analysis recommended grout of eight 3.01X areas to lower fire load
  - Safety mitigations in place in these areas to reduce fire risk
Conveyor System

- To reduce the fire load underground and improve safety, removal of the tunnel boring machine muck conveyor system was recommended in three phases:
  - Belt removal
  - Surface Sections removal
  - Subsurface Sections removal

- Surface structure and belt and ECRB cross drift belt removed
Water Supply System

Water wells J-13 and J-12 are the water wells for Yucca Mountain Project and National Nuclear Security Administration activities in Area 25

- Well J-13 submersible pump has failed and casing is degrading; J-12 is currently sole source of water
- Transfer pumps (from J-12 to J-13) are failing and need to be replaced
- Piping system from J-12 to J-13 is old and has had a number of breakages

Examining options to replace J-13 and system piping

Pursuant to an agreement with the State of Nevada, 420,000 gallons per year of potable water and 1.78 million gallons per year of non-potable water to support current operations is authorized for project use pending resolution of, or change status of, ongoing litigation
Gate 510 – Current Condition

- Entry point for site work staff and visitors with very limited functionality
- No badging capabilities
- No site access control capabilities
Gate 510 – Proposed Plan

- Construct new approx. 9,000 ft² facility at the existing Gate 510 location

- New Gate 510 facility functions include:
  - Enhanced security and access control
  - Badging
  - Site access control
  - Site access training and training verification
  - Backup emergency operations center supporting current activities
  - Hazardous material tracking
Site Access Road – Current Condition

- Constructed in early 1960s
- Hill and dale construction means with minimal sub-bed
- Deteriorating asphalt surface
- Poor drainage
- Increasing maintenance and repair needed
Site Access Road Proposed Improvements

- Draft Environmental Assessment examines alternatives for a new access road
- Options include:
  - Reconstruction of existing alignment or new direct route
Yucca Mountain Proposed Crest Road Improvements

Existing crest road is unpaved with grades up to 23%

- Draft Environmental Assessment examines alternatives to develop a new 1.3 mile crest road connection maintaining a <8% grade

- Connects with existing paved “H” road in vicinity of sub-dock area near north portal and intersects with road at the crest

- Chipseals road along Yucca Mountain crest
Offsite Power to the ESF– Current Conditions

- Current power provided by 69 kV line from the NTS Grid
- Only remaining 69 kV line on the NTS
- Limited to 10 MW total power
- Single-point failure
Offsite Power to the ESF - Proposed Improvements

- Draft Environmental Assessment examines alternatives a new 138 kV transmission line on site from Lathrop Wells switch
- Negotiate preferable utility use rates with utility vendor
- Construct a substation at lower muck yard
- Provide reliable power to North and South Portals
Communication System – Current Conditions

- Currently provided via analog microwave transmitter at north portal pad and interfaced with Nevada Test Site microwave system
- Functioning at maximum operating rate of 1 Mb
- Extremely slow
- Single-point failure
Communication System Upgrades

- Constructing new digital microwave transmitter system
- Towers to be installed at Exile Hill, Yucca Crest, and Gate 510 with interface with fiber optic line at Lathrop Wells.
- Increased transfer rate to 40 Mb
- Eliminate single-point failure
- Estimated completion in March 2007
Sample Management Facility

Proposed Plan

- Locate a facility for lease outside the boundaries of the Nevada Test Site

Current Condition

- Built in mid-1960s
- Currently at maximum capacity
- Rapidly deteriorating due to age
Summary

- DOE/OCRWM is committed to the safe and reliable operation of the Yucca Mountain Site
  - Safety upgrades and maintenance in the underground are prioritized based on need
- A draft Environmental Assessment has been completed addressing improvements at the Yucca Mountain Site
- Improvements can be initiated upon final DOE decision on the Environmental Assessment