Excavate North Ramp to Sta. 12+80m (4198 ft)

Excavate North Ramp to Sta. 10+80m (3477 ft)

Conveyor Installation

Test Alcove #3 Excavation

Excavate North Ramp to Sta. 9+80m (3250 ft)

Excavate 30 Meters of North Ramp

Test Alcove #2 Excavation

Excavate North Ramp to Sta. 5+60m (1837 ft)

Alcove #2 & TBM Excavation

Low TBM Advance Rate Due to Poor Ground Conditions

Station @ 0800 HRS 07-07-95

METERS FT

SCHEDULE 826.4 2711.3

ACTUAL 1137.9 3733.2

Low TBM Advance Rate Due to Poor Ground Conditions
Photos
Tunneling Advance

• Advance by segment
  - 3.8 meters/day average (up to station 3+75 meters)
  - 6.2 meters/day average (station 3+75 to 5+60 meters)
  - 11.9 meters/day average (station 5+60 to 10+60 meters)
  - Highest day rate: 23.6 meters / 77.5 feet
  - Highest weekly rate: 96.1 meters/ 315.2 feet
Subsurface Accomplishments

- Accomplishments
  - TBM Start - September 20, 1994 (Six weeks late)
  - Station 3+75 meters - March 8, 1995 (20 days late)
  - Station 5+60 meters - April 19, 1995 (1 day ahead of schedule)
  - Station 10+60 meters - June 16, 1995 (55 days ahead of schedule)
Subsurface Projections

• Projections
  – Station 12+80 - 2 months earlier than plan
  – Alcove #2 - July 24, 1995
  – Alcove #3 - Start August 18, 1995 - Ahead of schedule using generic alcove design
  – Subsurface Conveyor startup - July 17, 1995 - Additional conveyor sections on order
Continued Enhancements to Performance

Coordination and communications between engineering and construction personnel

• Actions Taken:
  – Title III Engineering in the field has been empowered to make decisions locally
  – Improved communications between all elements via weekly meetings (Design/Construction/DOE)
Continued Enhancements to Performance

(Continued)

Approach to procurement

- **Actions Taken:**
  - Continuous use or blanket orders are in place for most tunneling consumables. Purchase options are exercised expeditiously.
  
  - The implementation procedure for procurements are being revised to reduce the number of required steps for procurement actions.
Continued Enhancements to Performance

(Continued)

Quality Assurance Practices

• Actions Taken:
  – QA practices were reviewed and found to be appropriate, as required by design specifications
  – Designs specifications are being reviewed and modified to focus the technical requirements
Continued Enhancements to Performance
(Continued)

TBM production in faulted ground

• Actions Taken:
  – Steel lagging design changed for ease of installation
  – Wire mesh in place of steel lagging, when suitable
  – Super Swellex rockbolts authorized in addition to Williams rockbolts
  – Use of channel sections with rockbolts
Continued Enhancements to Performance
(Continued)

TBM production in faulted ground (Continued)

• Actions Taken:
  – Completed TBM Modifications
    » Hydraulic pumps and piping has been modified
    » Gripper cycle time has been reduced
Continued Enhancements to Performance

TBM production in faulted ground

• Actions Planned:
  – TBM Modifications
    » Shuffle shoe booster for more effective forward movement
    » Thrust modifications to allow push off from inverts
    » Moveable flaps to allow gap between grippers to be closed
    » Grippers modified to allow wider range of movement and extension
    » Three grip mode
  – Ground Support Design
    » Lighter steel sets being investigated
    » Investigating steel set spacing (4’ to 6’)
Continued Enhancements to Performance

(Continued)

Outage Management

• Actions Taken:
  - Developed concurrent operations to allow the TBM to continue advance during alcove excavation
  - Constructor has developed an approach to safely permit installation of conveyor during TBM operations
  - Underground utilities are shielded during blasting operations to eliminate need of removal and reinstallation
YMP Board of Consultants for Tunneling and Underground Construction

- Board of Consultants
  - Chairperson
  - 3 Board Members
- Technical Services Pool
- Board Charter
  - Provide recommendations for cost-effective tunneling, safety and design adequacy
  - Meet at two-month intervals
Board of Consultants

(Continued)

• Board Expertise
  – Geotechnical engineering
  – Construction management
  – Project management
  – TBM design and modifications

• Status
  – Chairperson selection in process
  – Candidate board members identified
  – Technical pool identified
Calico Hills Access Option

- YMP is reviewing a baseline change to the Program Plan to bring Calico Hills access forward from FY97 to FY95

- Drill-and-blast shaft access to Calico Hills level with east-west roadheader drift intersecting the Ghost Dance Fault and terminating at the Solitario Canyon Fault

- Option is decoupled from the main ESF loop and is not intrusive in the potential repository emplacement zone

- Funding limitations may impact implementation of option
Basis for Considering Calico Hills Option as Defined

- Lowest cost
- Best schedule
- Small capital investment
- Option lends itself to apply commercial standards to design and construction
ESF Summary

• ESF surface construction
  – All essential support to tunneling is working
  – Change house is behind schedule

• ESF subsurface construction
  – Meeting milestones
  – Ahead of schedule
  – Applied lessons learned effectively
  – Good safety record