

**U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT**

**NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING**


**SUBJECT: YUCCA MOUNTAIN TECHNICAL
PROGRESS UPDATE**

PRESENTER: DR. RUSS DYER

**PRESENTER'S TITLE
AND ORGANIZATION: ACTING PROJECT MANAGER
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
LAS VEGAS, NEVADA**

**PRESENTER'S
TELEPHONE NUMBER: (702) 794-7586**

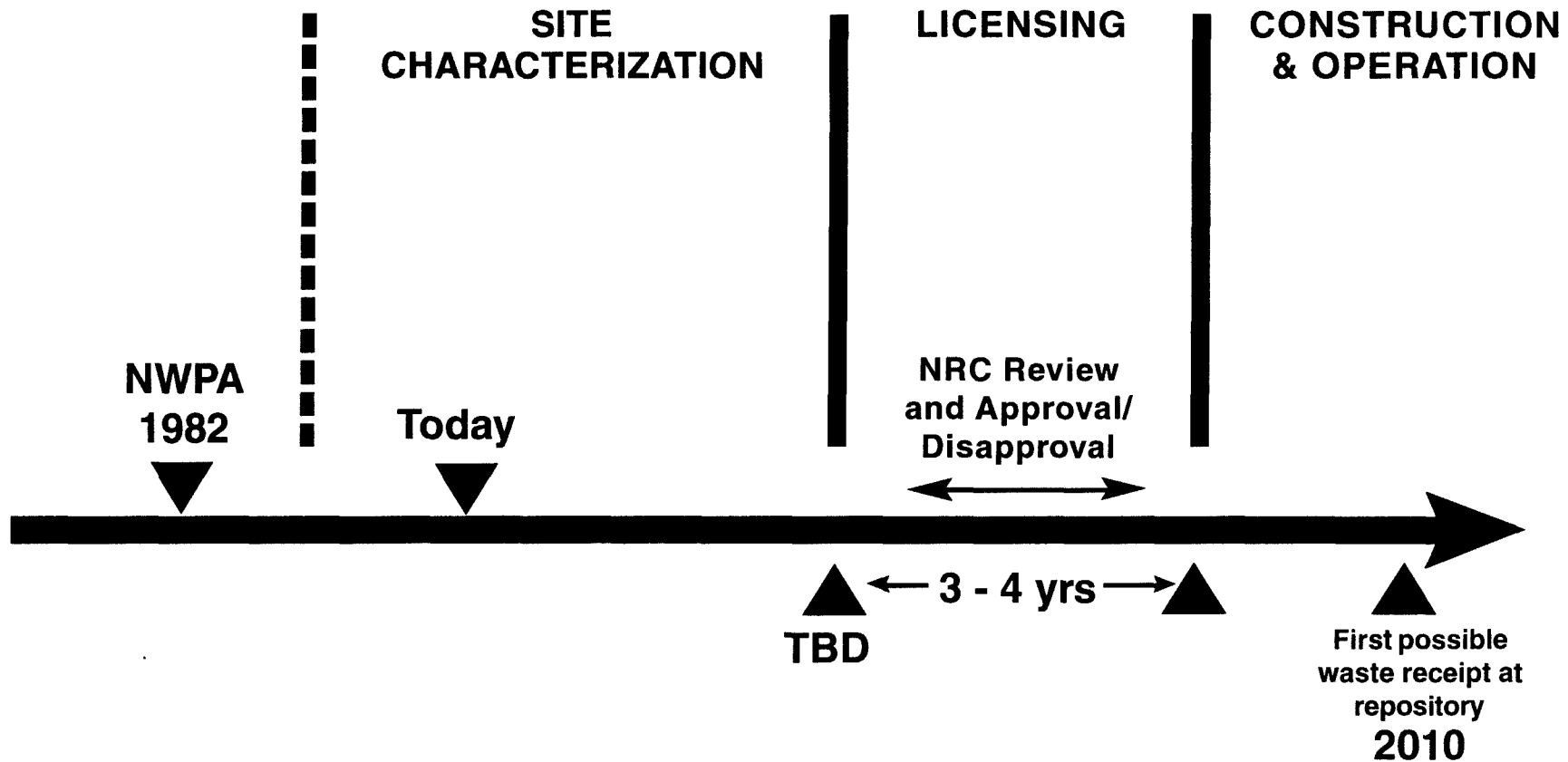
**LAS VEGAS, NEVADA
OCTOBER 19-20, 1993**



**200 FEET
IN THE MOUNTAIN**

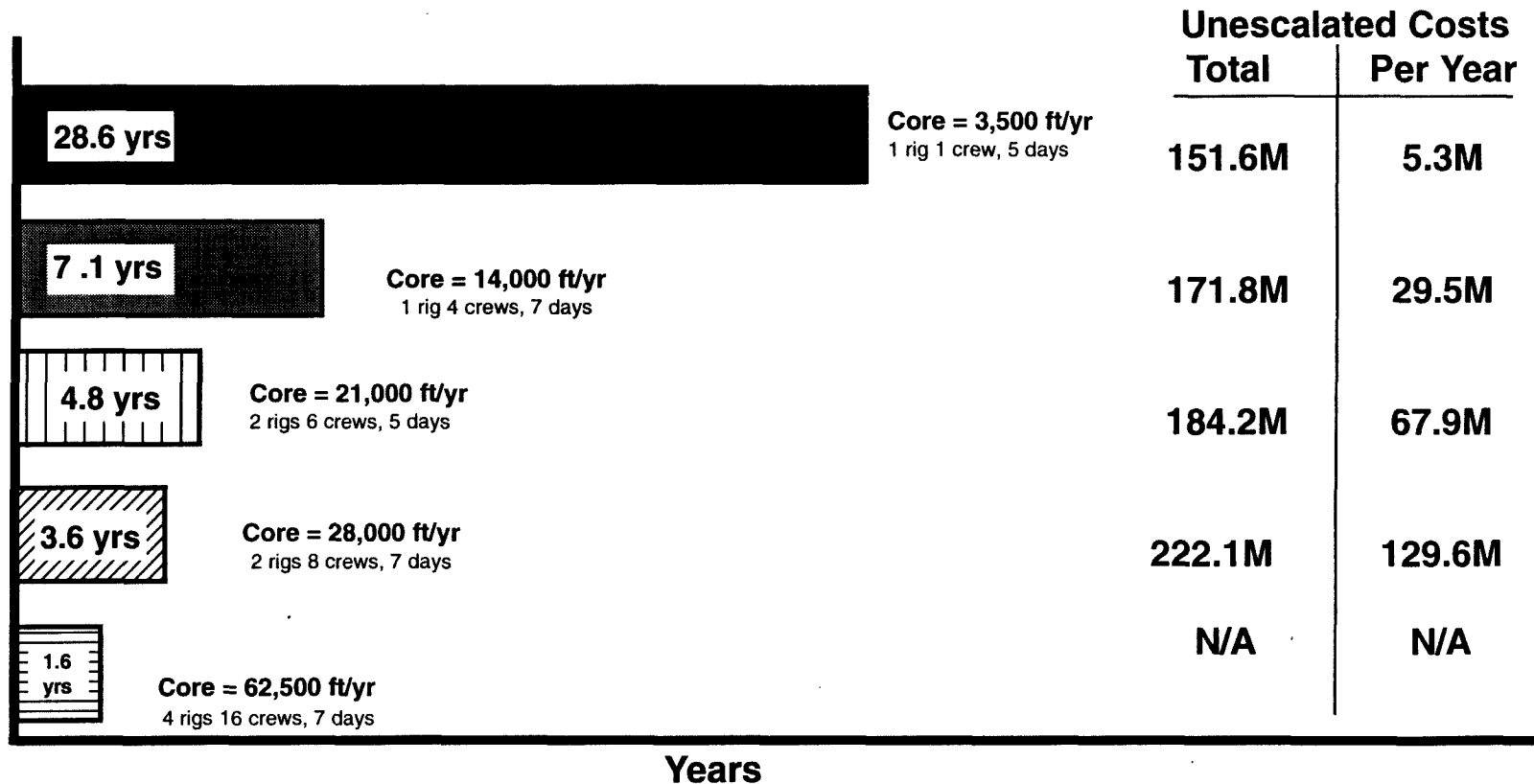
3 WEEKS AHEAD OF SCHEDULE

Scientific Studies Will Determine Whether Yucca Mountain can be Recommended as a Repository



LM-300 SCHEDULE FOR 40 DEEP BOREHOLES (SCP PLAN)

(Based on UZ-14 Performance)



* Basis

- 40 Deep holes @ 2,500 ft/hole = 100,000 ft core for program
- 1 crew can drill out 3,500 ft core/year assuming 250 working days, 5 days/week, 50 weeks at 14 ft/crew.

WBS Elements

- (1) 1.2.3.5 Drilling
- (2) 1.2.3 Site Investigation
- (3) 1.2.7.3 FOC
 - 1.2.13.2 Safety & Health
 - 1.2.15.2 Administrative Support
- (4) 1.2.7.8 NTS
 - 1.2.9.2 Project Control
 - 1.2.13.3 Environmental Compliance
 - 1.2.15.3 Training

Assumptions

- A. Incremental Crew Cost Increases as a result of Weekend Rates
- B. Includes \$250K/Yr/Crew for drilling consumables
- C. Reflects increases due to concurrent work required with second LM-300
- D. Includes 10,000K 1 time capital cost for additional LM-300

Surface-Based Testing Supports Resolution of Issues Including Regional Hydrology and Flow Rates, Seismic Hazard Analysis, and Volcanism

	Prior to 1987	1991- Sept. '93	Oct. '93- 2001
Boreholes	199	33	76¹ 58²
Trenches	95	24	25
Soil pits	0	108	40-50³

¹ 50 ft deep and greater

² 50 ft deep or less

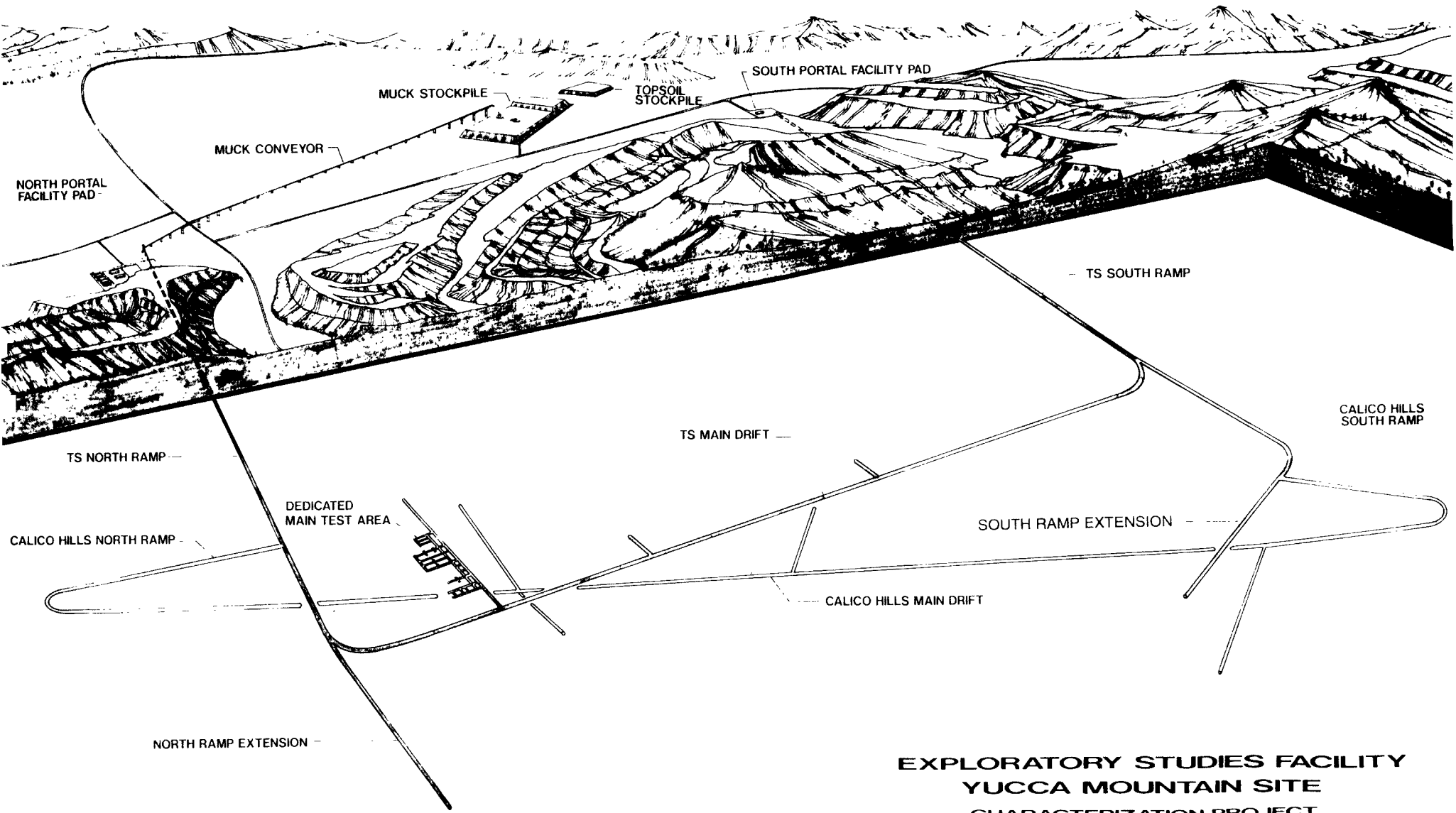
³ as req'd based on 20 facilities

Work Underway at Several Locations

Summary

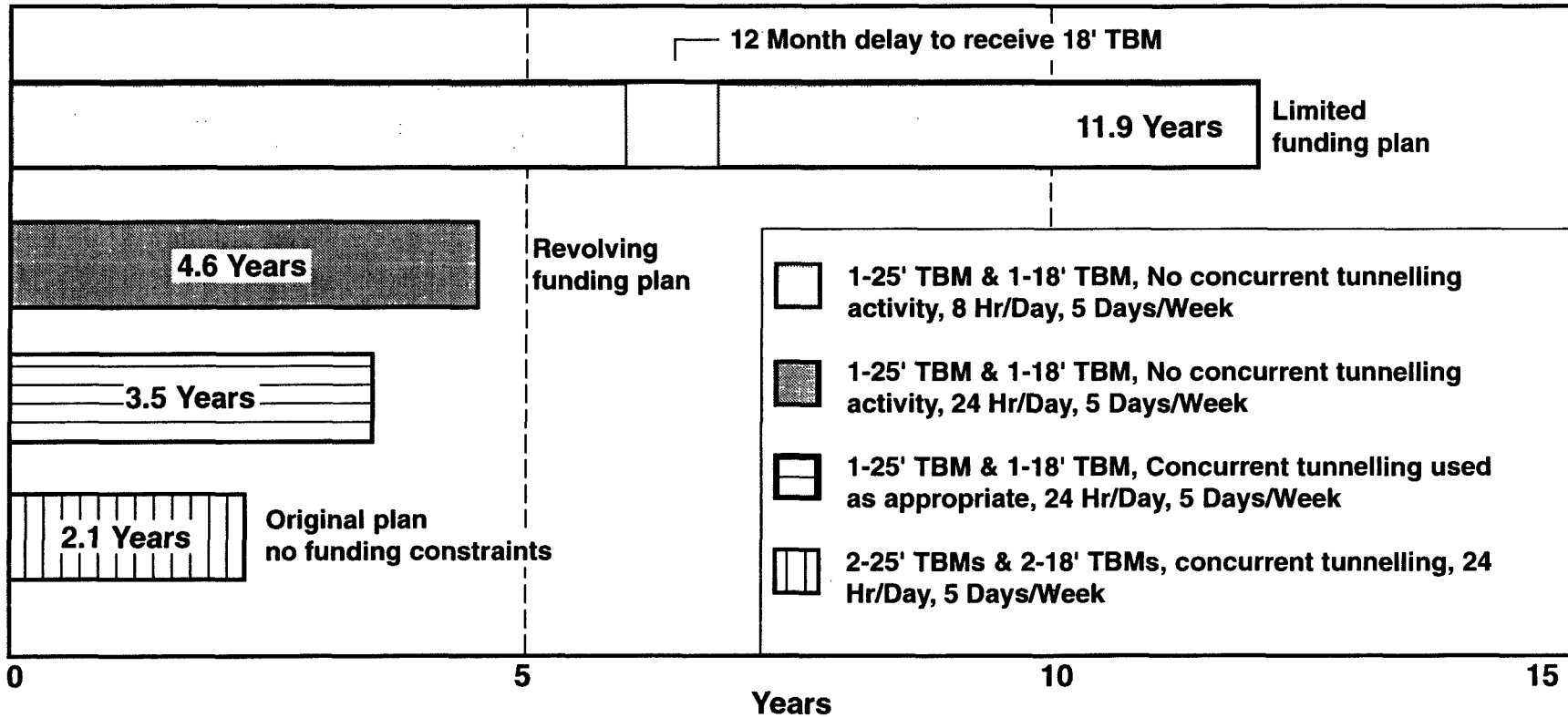
- 200 ft in the mountain, as of 9/9/93
- Initiated ESF testing with geologic mapping of the box cut and starter tunnel
- USW UZ-14 drilling began 4/15/93; 1391 ft depth, as of 10/14/93
- Drilling at borehole UZ-16 completed 3/11/93 at 1686 ft; water table was reached at a depth of 1604 ft; downhole testing currently underway
- 24 boreholes completed for natural infiltration studies program
- NRG-7 borehole planned to define geology transition section along the lower end of the north ramp
- 17 trenches excavated and 3 exposures cleared for Quaternary fault studies; detailed logging continues
- Fran Ridge large block test continues; ground preparation began for saw cutting of test block; preliminary cuts successfully performed

PROPOSED ESF DESIGN



**EXPLORATORY STUDIES FACILITY
YUCCA MOUNTAIN SITE
CHARACTERIZATION PROJECT**

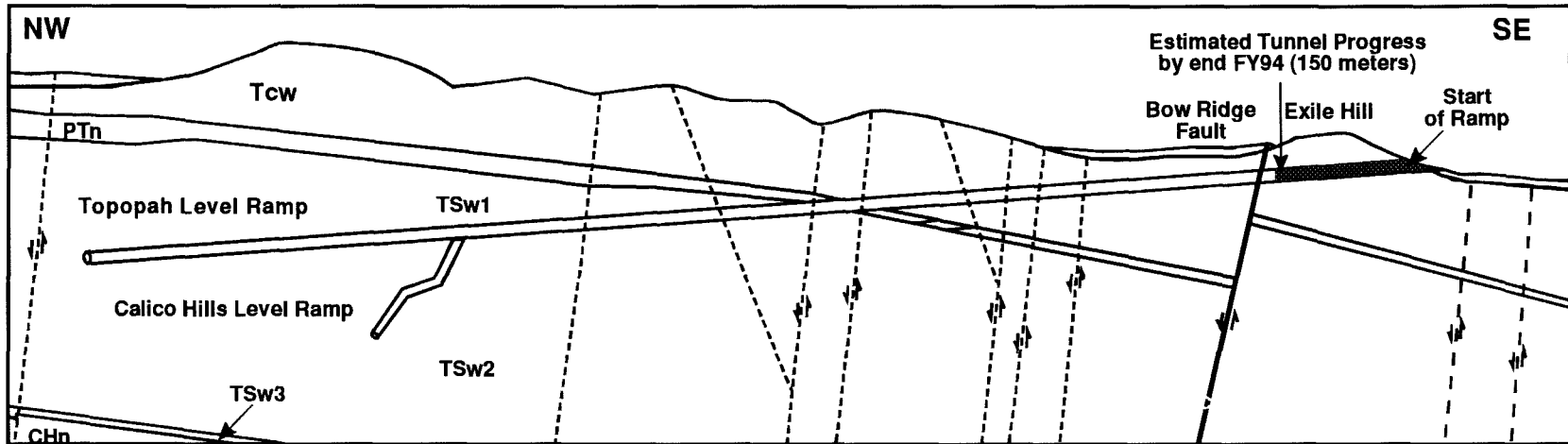
ESF TBM TUNNELLING SCHEDULES BASED ON FUNDING AVAILABILITY



Total Length of TBM excavation 20,200M (66,272 ft)

TBM Advance Rate 1 M/Hr,
Includes effects of stoppages for
scientific work

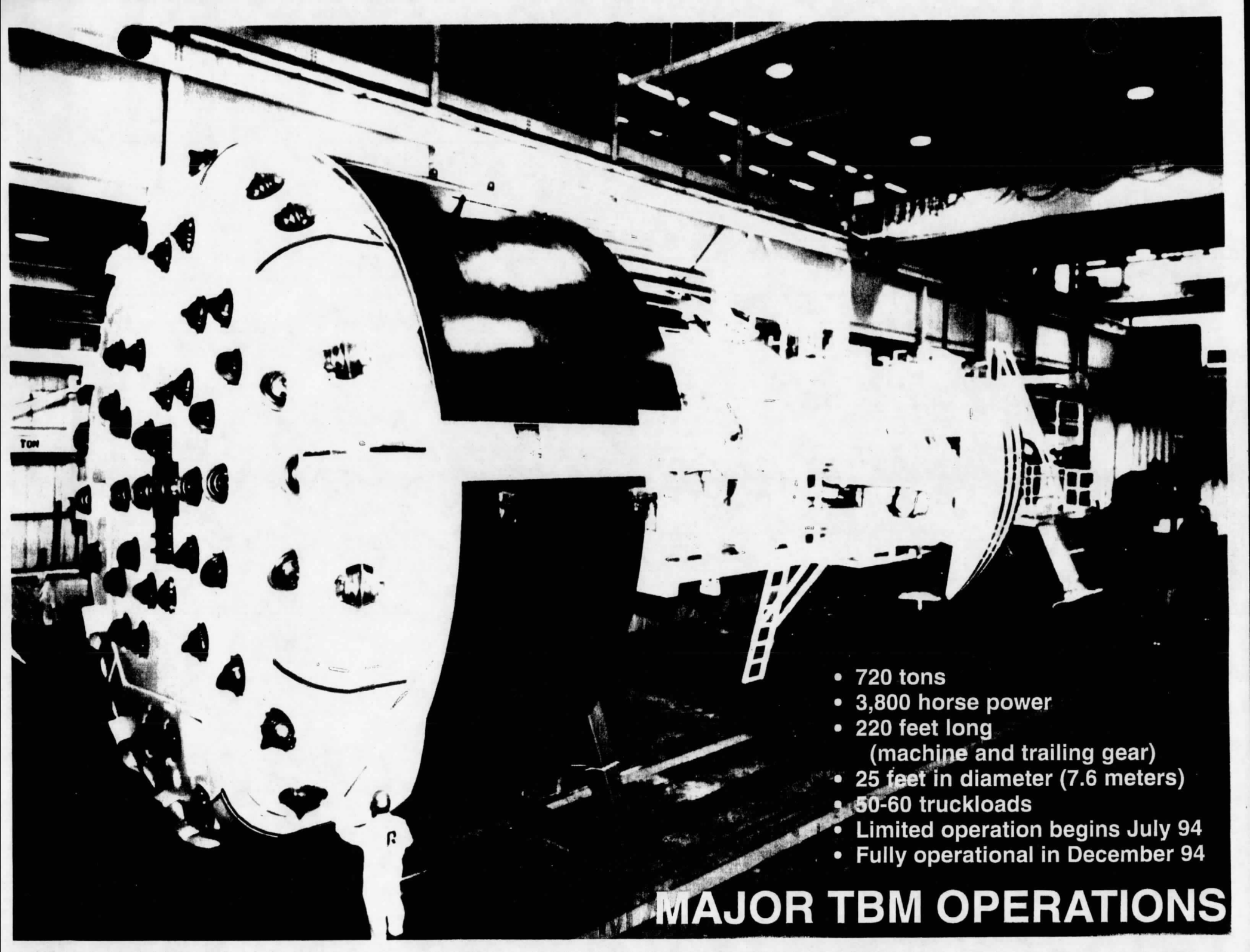
NORTH RAMP DESIGN WILL INCLUDE AREAS OF GEOLOGIC INTEREST TO BE STUDIED



Thermal/Mechanical Units

Tcw	<input type="checkbox"/>	Tiva Canyon Member	
PTn *	<input type="checkbox"/>	Yucca Mountain Member Pah Canyon Member and Bedded Tuff	
TSw1 TSw2	<input type="checkbox"/>	Topopah Spring Member	
TSw3	<input type="checkbox"/>	Topopah Spring Member	
CHn	<input type="checkbox"/>	Tuffaceous Beds of Calico Hills	* Not differentiated

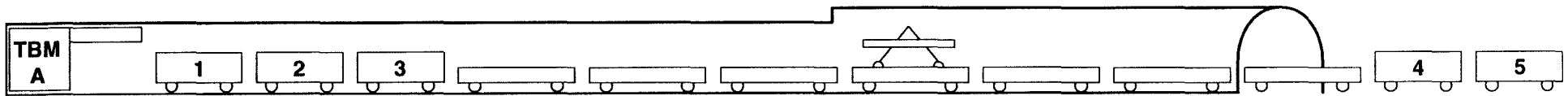
*Conceptual Illustration
Not To Scale*



- 720 tons
- 3,800 horse power
- 220 feet long
(machine and trailing gear)
- 25 feet in diameter (7.6 meters)
- 50-60 truckloads
- Limited operation begins July 94
- Fully operational in December 94

MAJOR TBM OPERATIONS

TBM Configuration



- **A - Cutter Head**

Car # Function/Contents

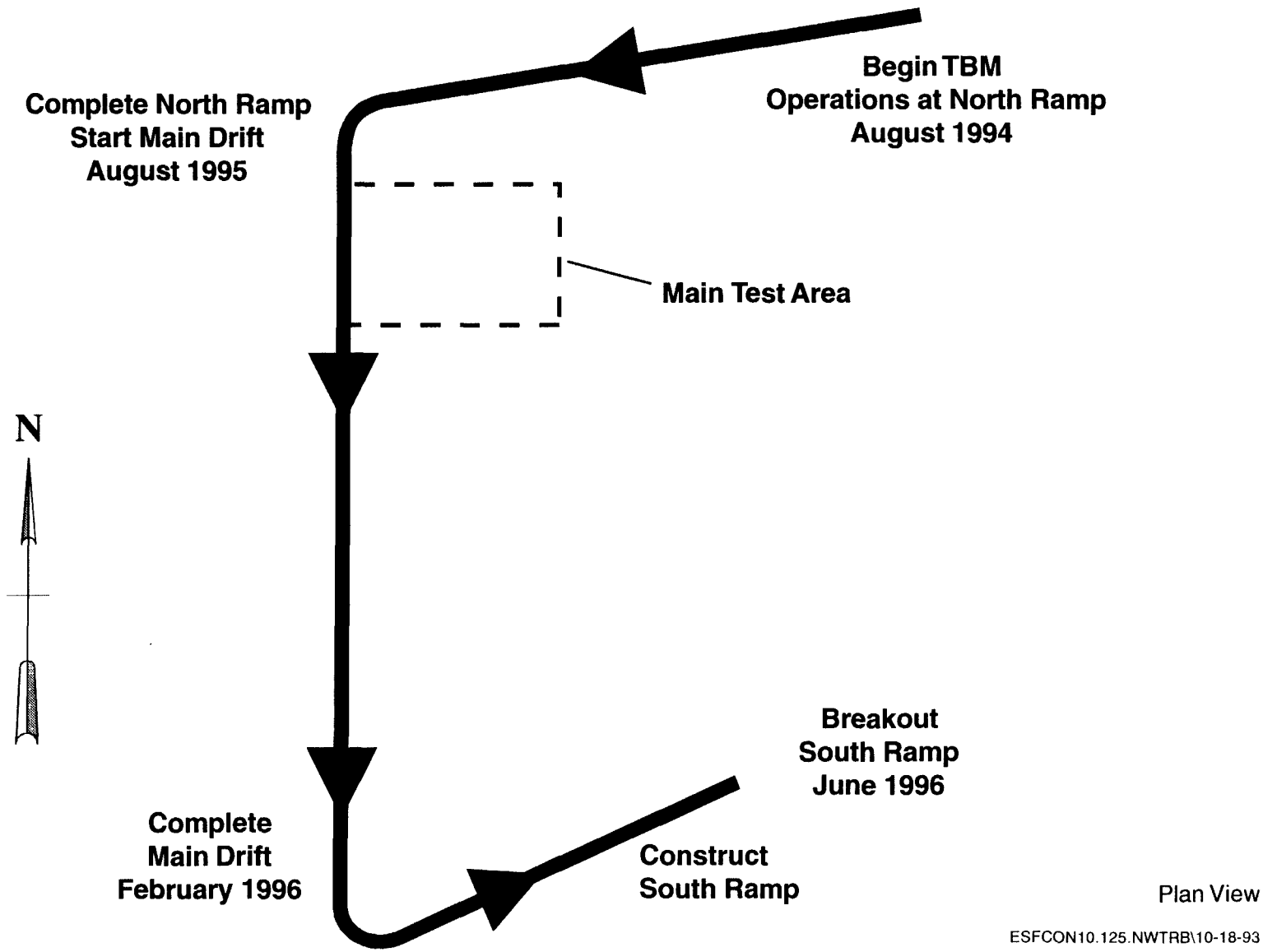
- **1** **Transformers, Spare Cutter Rack,**
- **2** **Lunch Room, Toilet, First Aid Room**
- **3** **Shop Area**

- **B - Mapping Platform on Trailing Floor Sections**

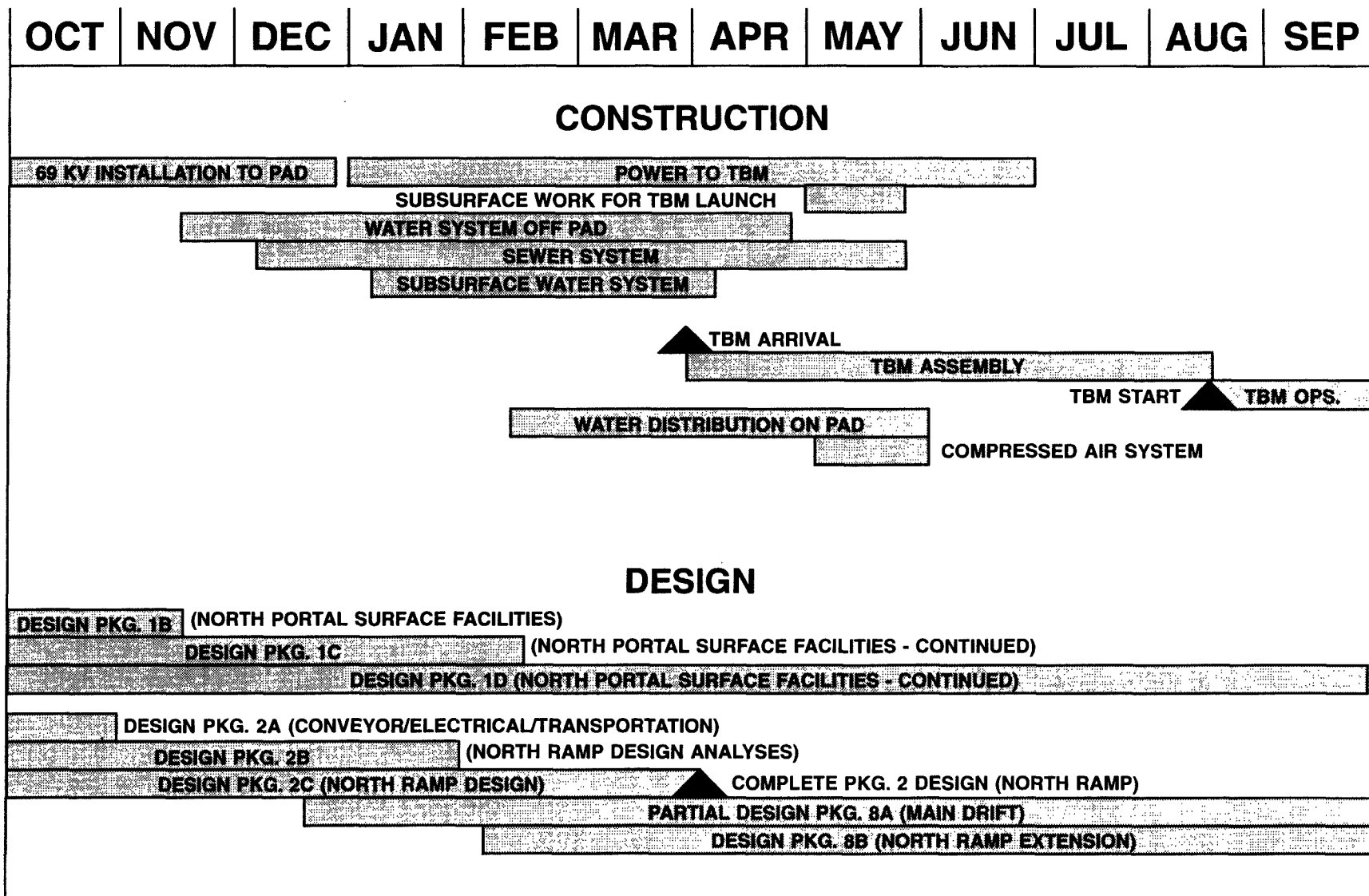
- **4** **Cable Storage, Ventline Cartridge, Conveyor Tailpiece,**
- **5** **Rock Bolt, and miscellaneous storage**

Estimated total length = ~ 450 ft.

INITIAL 5-MILE RAMP/DRIFT LOOP WILL PROVIDE EARLY SITE SUITABILITY INFORMATION

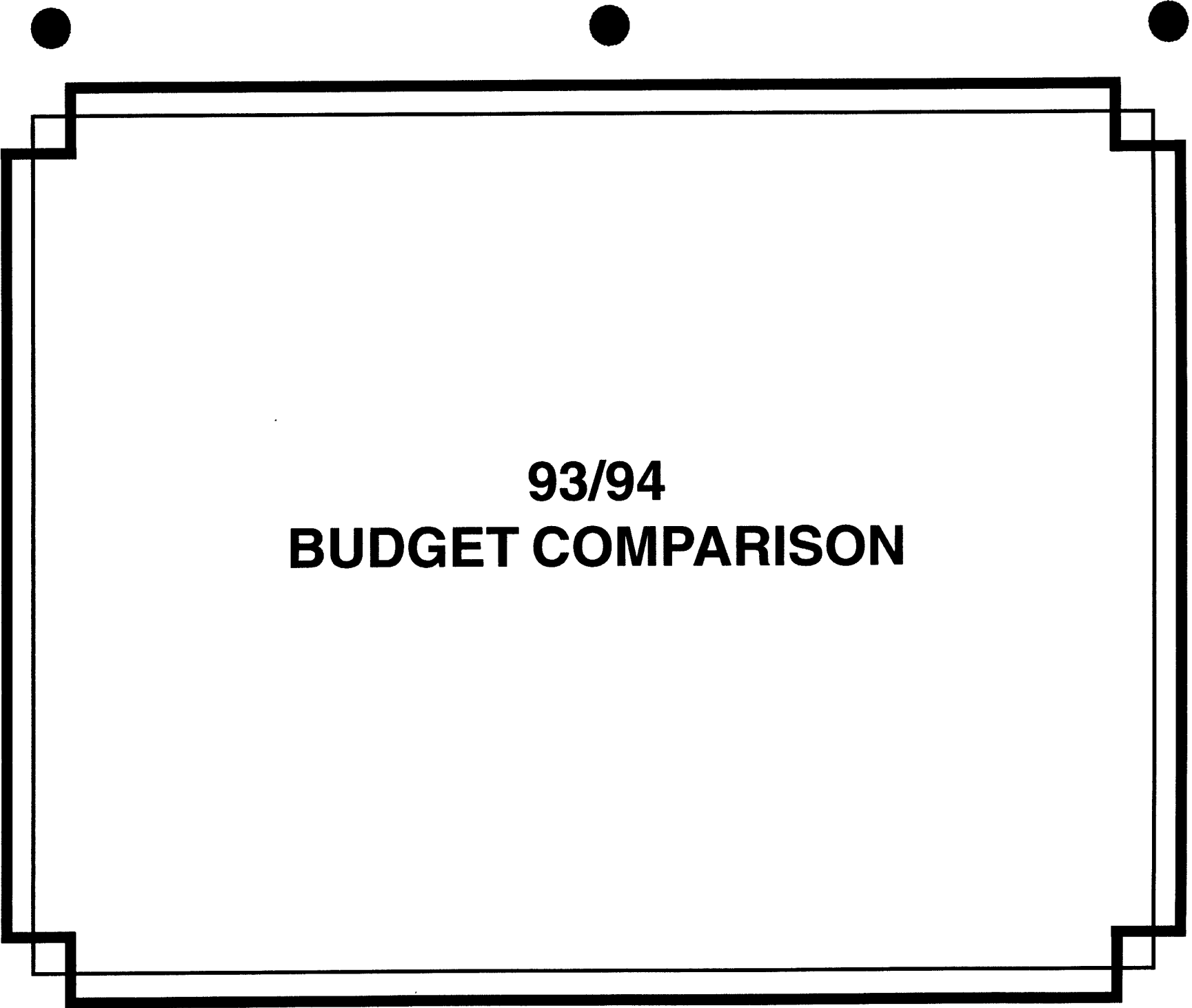


FY94 ESF SCHEDULE



August - September 1993 YMP Major Accomplishments

- **Completed ESF starter tunnel to 200 ft (60 meters) ahead of schedule**
- **Underground subcontractor (Kiewit/PB) brought on board**
- **Blasting of test alcove started October 4, 1993**
- **Received drinking water system permit allowing construction work on ESF sewer and water line system**
- **Completed extensive archaeological field data recovery near Bare Mountain**
- **Held waste package workshop, attended by oversight groups**
- **Completed 24 hole neutron drilling program**
- **Semiannual Progress Report 8 released**
- **Submitted draft FY94 annual plan to OCRWM**



93/94
BUDGET COMPARISON

	FY93	FY94	94-93	Decreases	Increases
Technical					
1.2.2 Waste Package	9.0	10.5	1.5		1.5
1.2.3 Site Investigations	54.6	58.9	4.3		4.3
1.2.4 Repository	4.9	5.0	0.1		0.1
1.2.5 Regulatory	26.4	23.8	-2.6	-2.6	
1.2.6 ESF	47.0	55.0	8.0		8.0
Total Technical	141.9	153.2	11.3	-2.6	13.9
Infrastructure					
1.2.1 Systems Engineering	6.3	5.8	-0.5	-0.5	
1.2.7 Test Facilities	10.5	12.9	2.4		2.4
1.2.9 Project Management	18.1	16.7	-1.4	-1.4	
1.2.11 Quality Assurance	10.2	9.0	-1.2	-1.2	
1.2.12 Information Management	12.0	10.5	-1.5	-1.5	
1.2.13 Environmental Safety & Health	15.1	14.7	-0.4	-0.4	
1.2.14 Institutional	3.6	4.0	0.4		0.4
1.2.15 Support Services	21.9	20.0	-1.9	-1.9	
Total Infrastructure	97.7	93.6	-4.1	-6.9	2.8
Total Technical & Infrastructure	239.6	246.8	7.2	-9.5	16.7
% Technical	59.22%	62.07%			
1.2.10 Financial Assistance	17.6	19.6	2.0		2.0
Total (Inc Financial Assistance)	257.2	266.4	9.2		

YMP FY94 Work Scope and Priorities

Exploratory Studies Facility

- **Procure equipment required to start TBM operation: 69kV power line; muck handling system; underground ventilation equipment; stand-by generators and mine power equipment; and TBM service equipment**
- **Begin TBM operations in ESF north ramp**
- **Initiate testing in north ramp**
- **Conduct surface-based testing needed to support ESF design and construction**

YMP FY94 Work Scope and Priorities

(Continued)

Compliance

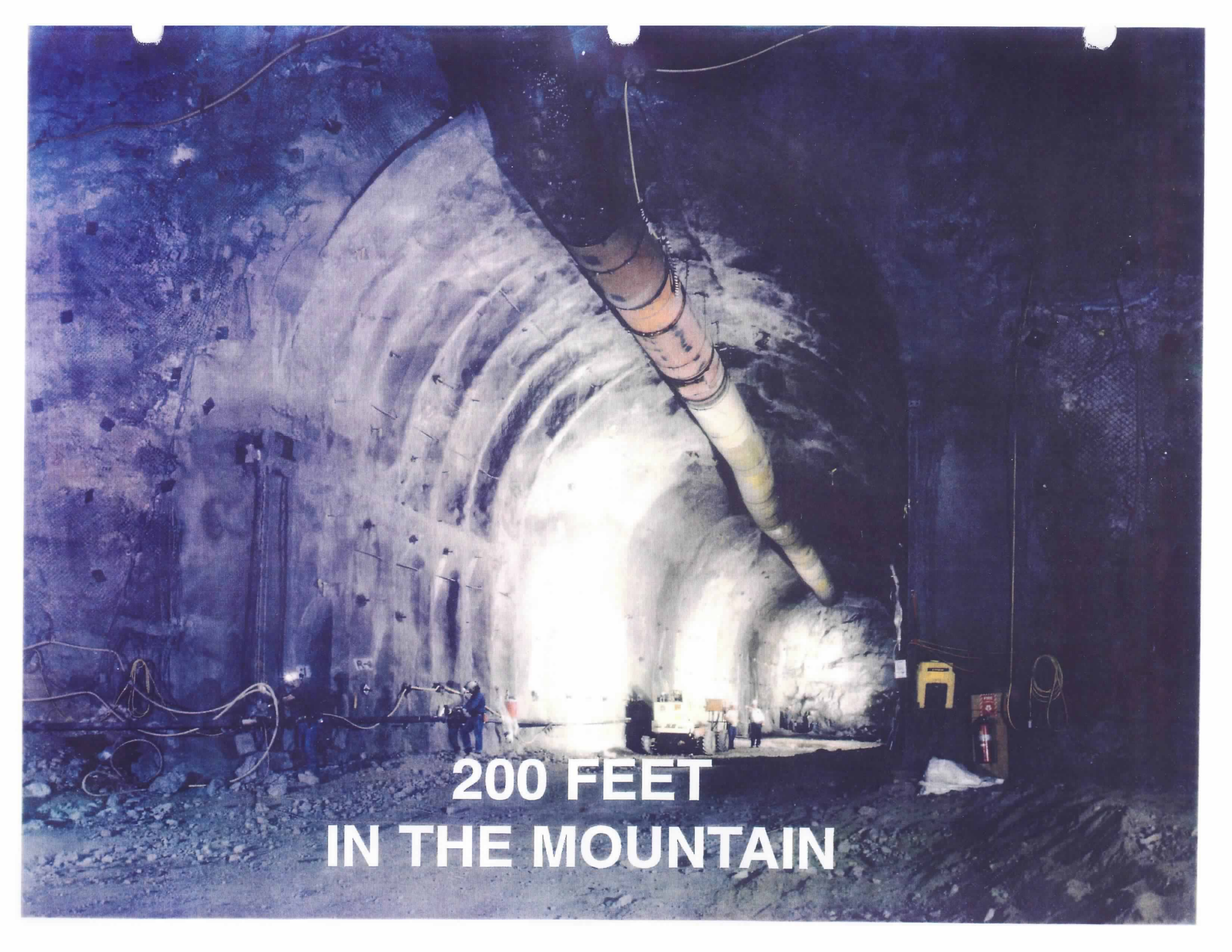
- **Maintain sound worker safety and environmental programs supporting field activities and construction**
- **Assure continued implementation of QA program through audits and surveillances**

YMP Major Deliverables/Planned Accomplishments First Half of FY94

<u>Deliverable/Accomplishment</u>	<u>Tentative Completion Date</u>
• Submit topical report on Seismic Hazard methodology to NRC	Nov 1993
• Combine Participant 1993 TSPA products into DOE TSPA position document	Jan 1994
• Meet with Energy System Acquisition Advisory Board (ESAAB)	First Qtr. FY94
• Continue construction and other preparations to receive TBM on site	First Half FY94

YMP FY94 Major Activities

<u>Major Activities</u>	<u>Planned Completion Date</u>
• Submit topical report on Seismic Hazard methodology to NRC	Nov 1993
• Combine Participant 1993 TSPA products into DOE TSPA position document	Jan 1994
• Complete design of north ramp (Package 2)	Mar 1994
• Receive 50-60 truckloads of TBM and TBM support equipment	Apr 1994
• Start TBM operations	Aug 1994
• Complete design of north portal surface facilities (Package 1)	Sep 1994
• Complete design of north ramp extension (Package 8B)	Sep 1994
• Complete 2 UZ holes using LM-300 drill rig	Sep 1994
• Start Systematic Drilling Program and complete 2 SD boreholes	Sep 1994
• Complete 1 north ramp and 3 south ramp boreholes	Sep 1994

A photograph of a large-scale underground tunnel construction project. The scene is dimly lit, with a bright light source illuminating the center of the tunnel. A massive, dark-colored pipe or tunnel boring machine (TBM) cutterhead is visible, extending from the top of the frame down towards the center. The tunnel walls are rough and rocky, with some sections appearing to be reinforced with mesh or concrete. Several workers in hard hats and safety gear are visible in the distance, working on the tunnel floor. The overall atmosphere is industrial and cavernous.

**200 FEET
IN THE MOUNTAIN**