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

NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING

SUBJECT: EXPLORATORY STUDIES FACILITY UPDATE

PRESENTER: RICHARD CRAUN

PRESENTER'S TITLE AND ORGANIZATION: ASSISTANT MANAGER, ENGINEERING AND FIELD OPERATIONS
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT OFFICE
LAS VEGAS, NEVADA

TELEPHONE NUMBER: (702) 794-7787

LAS VEGAS, NEVADA
JANUARY 10-11, 1996

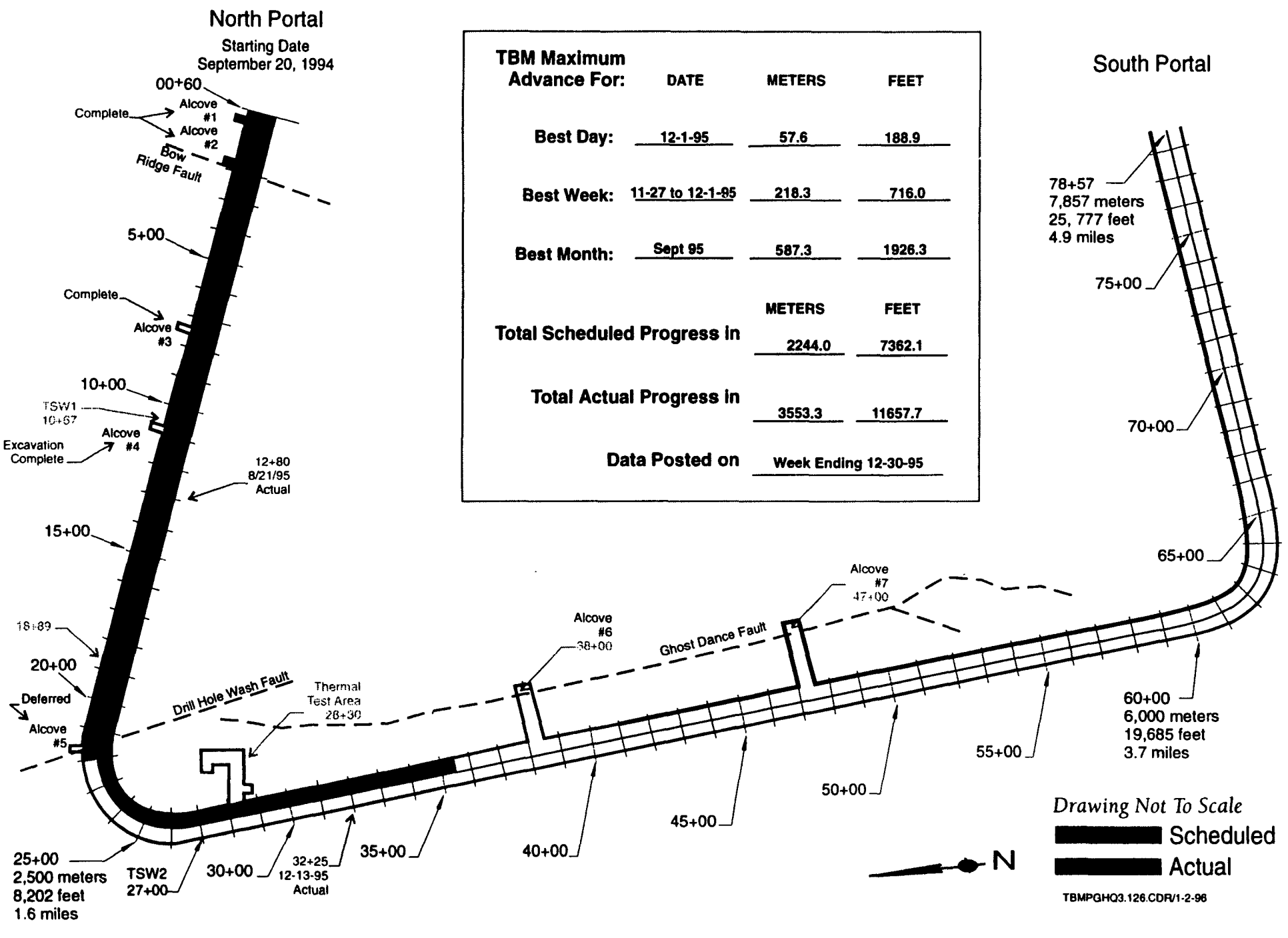
Outline

- TBM Progress
- FY96 Plans

ESF Tunneling Operations Update

- TBM at Station 35+53.32 as of 8:00 a.m. January 2, 1996
- Set potential world record for 7-9 meter diameter TBM with "best week" of 218.3 meters
- FY96 TBM advance to date is 1,511 meters (5,087 feet)
- Completed Alcove 4 excavation with Alpine Miner November 13, 1995
- Reached repository horizon (TSw2) at Station 27+20 on November 9, 1995
- Completed 1000 hour maintenance December 10, 1995
  - Approximately 100 items checked normal, including
    - * Cutter head
    - * Main bearing and seal
    - * Conveyor
    - * Forward and gripping shields
    - * Back Decks
    - * Automatic fire suppression system
    - * Oil, hydraulic fluids and seals
  - No indication of unusual contamination or premature wear

TUNNEL BORING MACHINE PROGRESS



TBM Maximum Advance For:	DATE	METERS	FEET
Best Day:	12-1-95	57.6	188.9
Best Week:	11-27 to 12-1-95	218.3	716.0
Best Month:	Sept 95	587.3	1926.3

	METERS	FEET
Total Scheduled Progress In	2244.0	7362.1
Total Actual Progress In	3553.3	11657.7

Data Posted on: Week Ending 12-30-95

FY96 Baseline

- Started FY96 722 meters ahead of plan
- Objective to maximize tunnel advance and to minimize cost
  - Excavate to Station 39+40
  - Excavate Alcove #4
  - Excavate Phase I of thermal test area
  - Excavate first Ghost Dance Fault Alcove
- Complete surface facilities
  - Change house, switchgear building, water/sewer, and subsurface wastewater system

FY96 Proposed Baseline Changes

- Operation efficiencies, faster excavation rates, and deferred surface facility construction create opportunities to
  - Excavate beyond 39+40
  - Support science program
  - Ensure designs are in place for FY97 ESF construction

THERMAL TESTING IN THE ESF – PHASE I
Illustrative Plan View Schematic

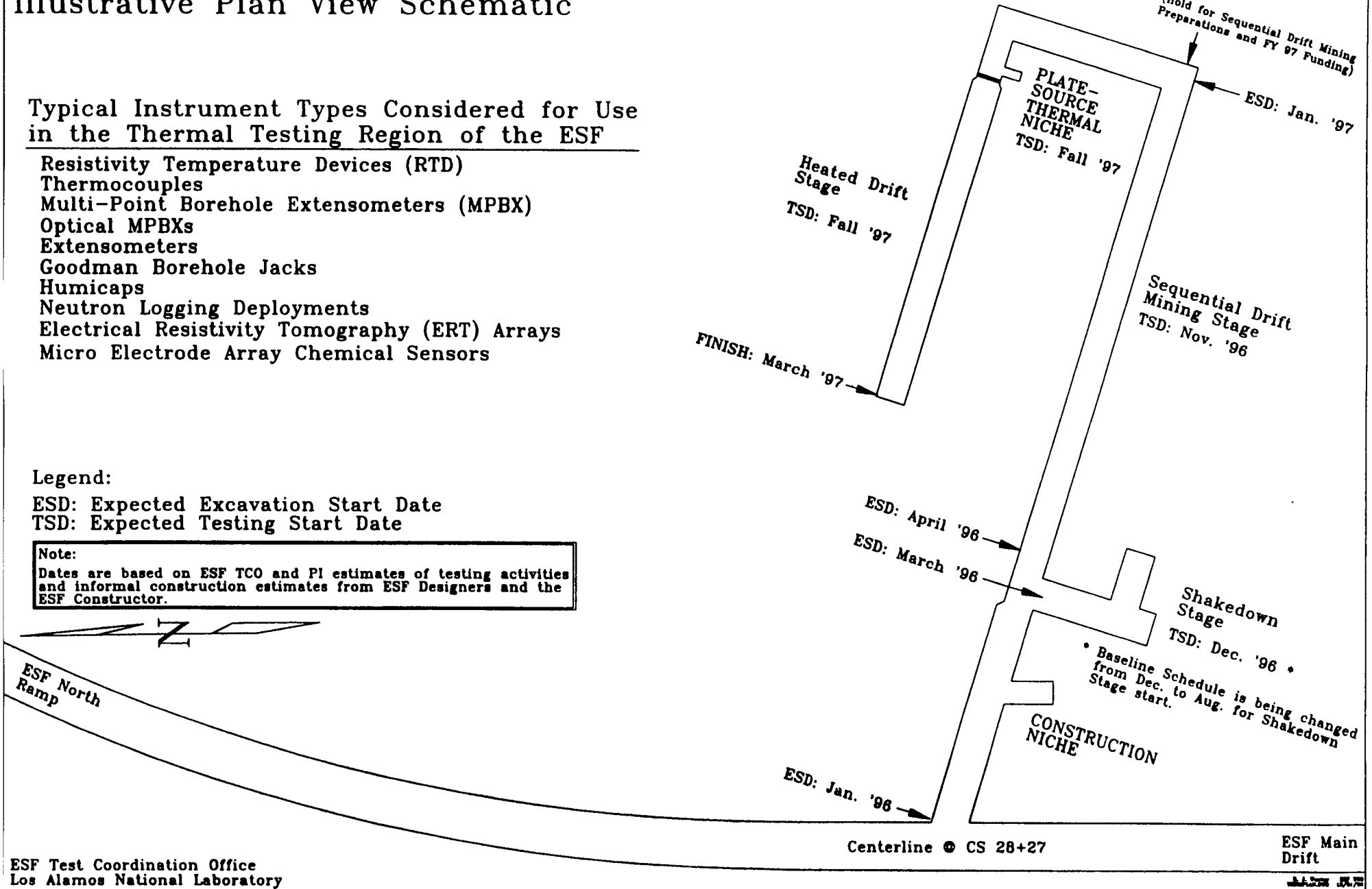
Typical Instrument Types Considered for Use in the Thermal Testing Region of the ESF

- Resistivity Temperature Devices (RTD)
- Thermocouples
- Multi-Point Borehole Extensometers (MPBX)
- Optical MPBXs
- Extensometers
- Goodman Borehole Jacks
- Humicaps
- Neutron Logging Deployments
- Electrical Resistivity Tomography (ERT) Arrays
- Micro Electrode Array Chemical Sensors

Legend:

ESD: Expected Excavation Start Date
TSD: Expected Testing Start Date

Note:
Dates are based on ESF TCO and PI estimates of testing activities and informal construction estimates from ESF Designers and the ESF Constructor.



ESF Test Coordination Office
Los Alamos National Laboratory

Thermal Testing Schedule

Activity	Proposed Schedule
Complete and control scientific program field work package	Feb/96
Complete PI authorized test design	Aug/96
ESF design for first 125 meter drive including shakedown	Completed Jan/96
Breakout access drift from ESF main drift	Jan/96
Begin excavation of shakedown test area	Mar/96
Complete excavation of shakedown test area	Apr/96
Begin drilling/coring (shakedown)	Apr/96
Complete instrumentation and DAS installation (shakedown)	*Dec/96
Shakedown stage heater turn-on	*Dec/96
Complete shakedown heating cycle and post-test characterization	Sep/97
Begin long-term monitoring	Sep/98
Complete excavation of the heated drift	Mar/97
Complete drilling/coring, instrumentation & DAS installation (heated drift)	Oct/97
Heated drift stage heater turn-on	Oct/97
Complete heated drift heating cycle and post-test characterization	Sep/01
Begin long-term monitoring	Sep/01

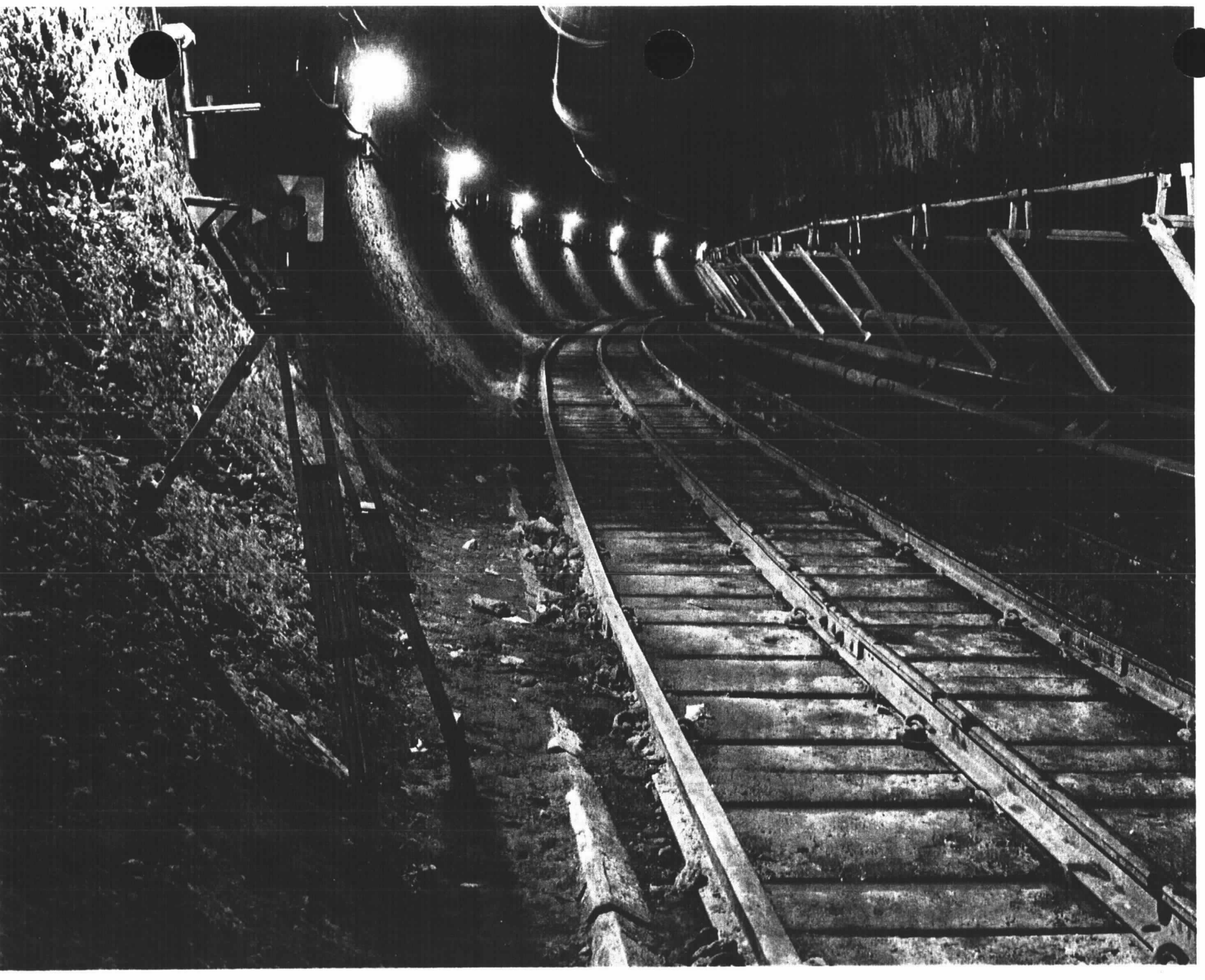
* Baseline schedule is being changed from December to August for shakedown stage start

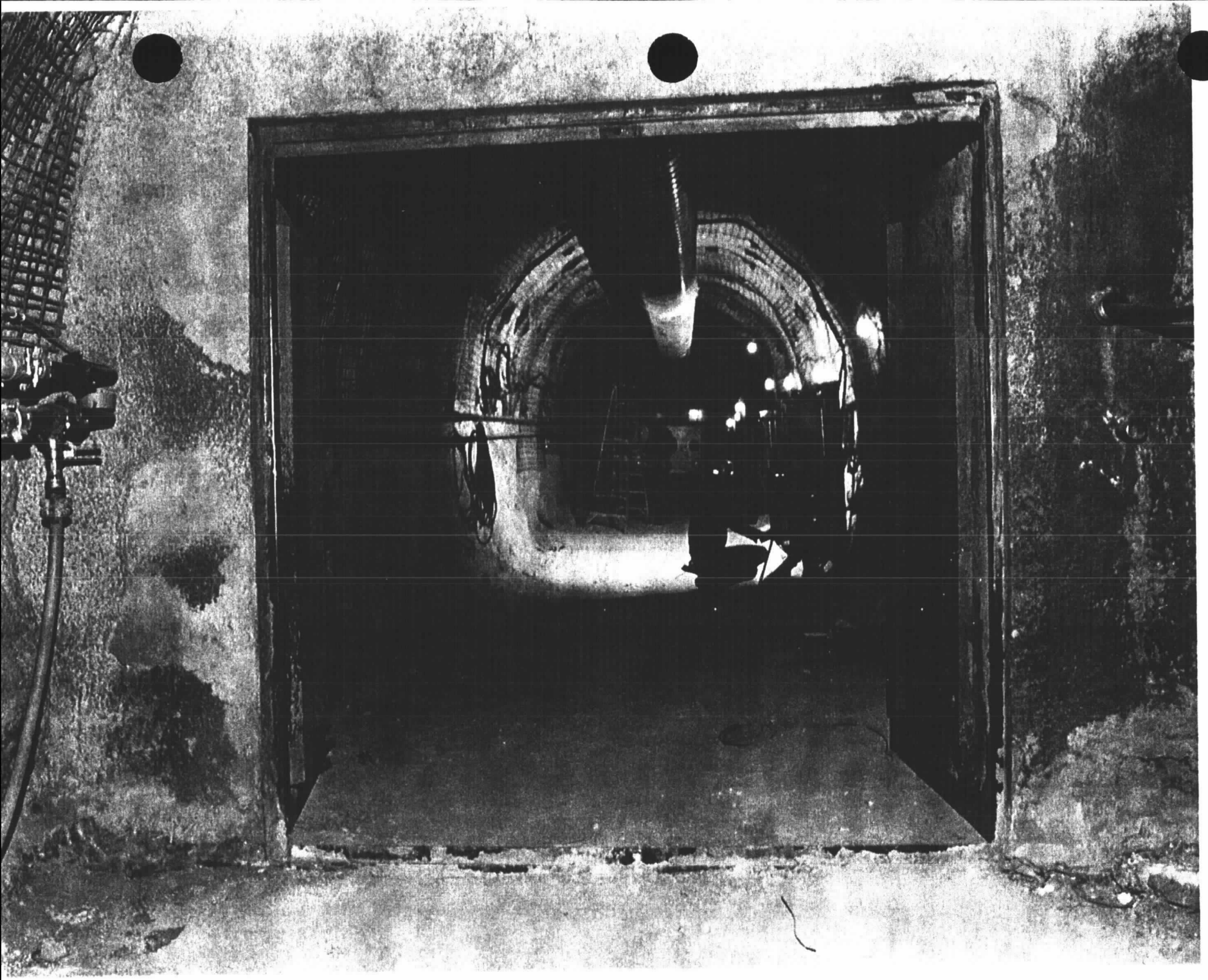
Use of Thermal Test Data for Repository Design

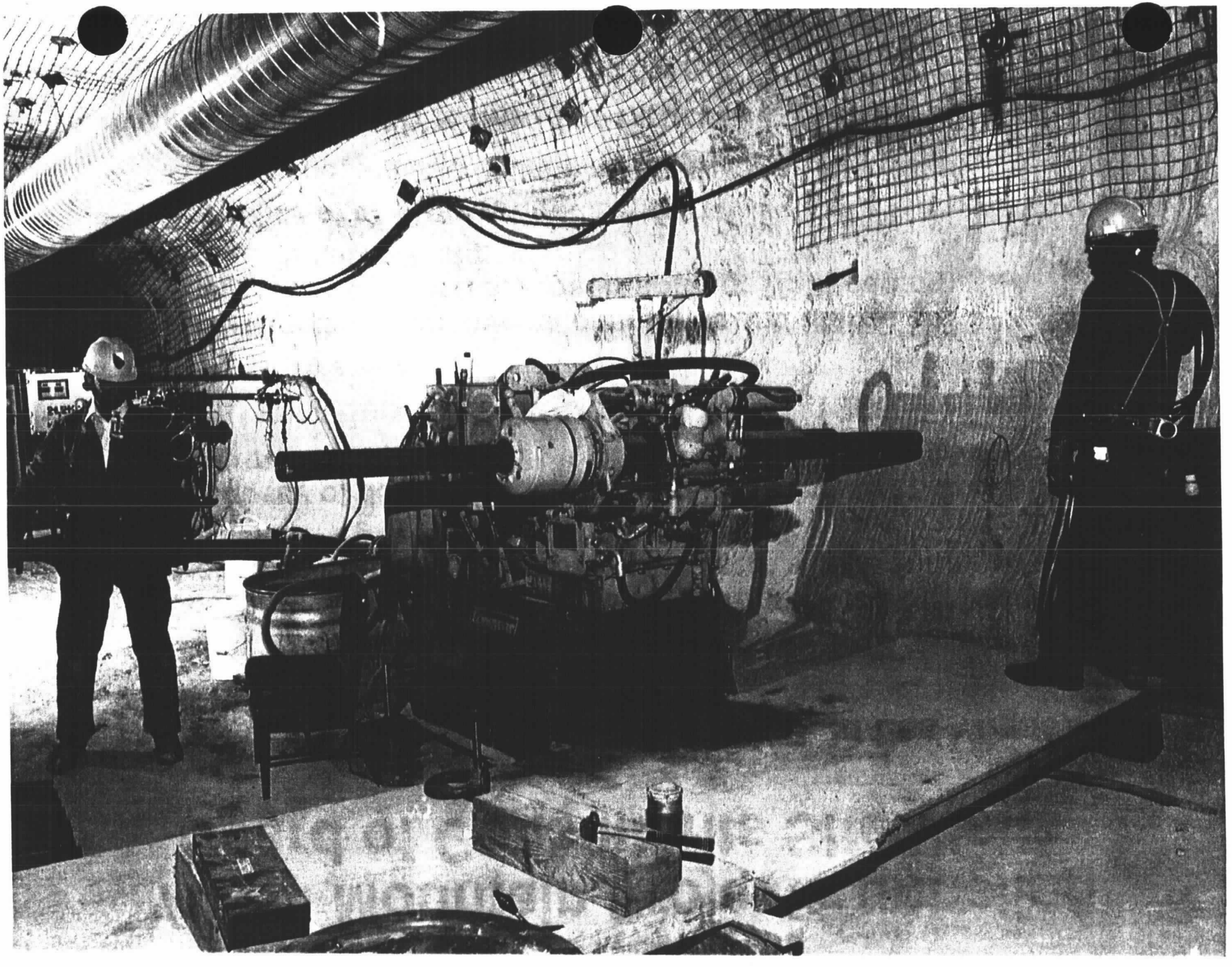
Test Data	Design Use
• Rock mass thermal properties (e.g. thermal capacity, conductivity, expansion, deformation modulus)	• Numerical analysis for temperature distribution, deformation of drifts, and stresses
• Drift convergence, rock temperature, rock mass ground support interaction	• Verification of emplacement drift design and computer analyses
• Changes in rock saturation	• Cooling of emplacement drifts by ventilation
• Water chemistry	• Design of ground support material

Use of Thermal Test Data for Engineered Barrier Design

Test Data	Design Use
• Rock mass thermal properties (e.g. thermal capacitance, conductivity, expansion, deformation modulus)	• Numerical analysis for near-field temperature distribution and structural design impacts of rock fall mass
• Water chemistry (and the effect of materials), rock saturation, drift humidity, permeability, fracture flow, "drying front," and material corrosion rates	• Input to corrosion models, design of engineered barriers and support structures, and verification of performance







Yucca Mountain Project Tunneling Board of Consultants Site Visits

- First meeting held October 24-25, 1995, in Las Vegas. First report noted
  - Safety: well-managed and safety-conscious
  - Cost effectiveness: alcove excavation does not interfere with TBM progress; mining hours being maximized; appearance and general housekeeping is very good
  - Adequacy of design: requested additional information about Q-list for ground support
- Second meeting held December 11-13, 1995, in Las Vegas, to review
  - Cost-effectiveness: overall operations and utilization; organizational structure; cost-reporting; TBM-loading; productivity-reporting
  - Adequacy of design: ground support
  - Report expected end of January 1996
- Next meeting scheduled for February 14-16, 1996