

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

**NUCLEAR WASTE TECHNICAL REVIEW BOARD  
STRUCTURAL GEOLOGY & GEOENGINEERING PANEL MEETING**

**SUBJECT: EVALUATION OF A PROTOTYPE  
TESTING FACILITY**

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YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT  
LAS VEGAS, NEVADA**

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**PLAZA-SUITE HOTEL • LAS VEGAS, NEVADA  
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# EVALUATION OF A PROTOTYPE TESTING FACILITY\*

\* OR, WHY BUSTED BUTTE?

- Consideration of an off-block test prototyping facility identified in SCP
  - desirable for specific testing to be conducted off-block
- Schedule concerns led to recent reconsideration of an alternative testing facility
  - increased model development time and confidence in long term thermal testing

# BENEFITS OF AN OFF-BLOCK TEST PROTOTYPING FACILITY

- Modeling
- Developmental/prototyping
- Schedule benefits

# MODELING BENEFITS

- Provides separate facilities for model development and model confirmation/validation testing
  - perceived need for aggressive in situ testing capability
  - development testing off-block
  - confirmation/validation testing in the ESF

# DEVELOPMENTAL PROTOTYPING

- Provides for test prototyping--experimental test development of unique tests
- Provides for test instrumentation development/modification
- Provides for development/optimization of long-term monitoring instrumentation schemes
- Provides facility for construction/excavation technique development

# SCHEDULE BENEFITS

Some alternatives could

- Support an early start of coupled-process testing (heater test)
- Provide early access to Calico Hills formation and vitric non-welded tuff for testing and comparison with surface-based testing techniques
- Require a limited design review process for developmental testing limited to worker safety evaluations (Impacts to waste isolation capabilities or test interference are not issues)
- Minimize potential developmental testing schedule delays resulting from conflicting priorities in ESF development
- Provide flexibility for developmental testing changes/modifications as testing is conducted

# STATUS

- An alternative/prototype test facility is conceptually appealing
- Resource allocation in FY 93 to an alternative test facility detracts from early start-up of ESF
- Acceleration of ESF program decreases some of the schedule-driven benefits of an alternative testing facility
- Although a prototype facility is not in the plan for FY 93, it will remain on the shelf as a potential future option

# STUDY PLANS RELATED TO ESF

Describes Work to be Done on **Samples Collected From** the ESF

Water Movement Test LANL

Characterization of Percolation in the Unsaturated Zone-  
Surface Based Study USGS

Mineralogy, Petrology, and Chemistry of Transportation  
Pathways LANL

History of Mineralogical and Geochemical Alteration of  
Yucca Mountain LANL

Biological Sorption and Transport LANL

Laboratory Thermal Properties LANL

Laboratory Thermal Expansion Testing SNL

Laboratory Determination of the Mechanical Properties of  
Intact Rock SNL

Laboratory Determination of the Mechanical Properties of  
Fractures SNL

Characterization of the Effect of Man Made Materials on  
Water Chemistry in the Post Emplacement Environment LLNL

# STUDY PLANS RELATED TO ESF

Describes **Work to be Done** in the ESF

Characterize Yucca Mountain percolation in the Unsaturated Zone-ESF Investigations	USGS
Diffusion Tests in the ESF	LANL
Demonstrate Applicability of Laboratory Data to Repository Transport Calculations	LANL
Characterize Structural Features within the Site Area	USGS
Excavation Investigations	SNL
In Situ Thermomechanical Properties	SNL
In Situ Mechanical Properties	SNL
In Situ Design Verification	SNL
Characterization of Site Ambient Stress Conditions	USGS
Engineered Barrier System Field Test	LLNL
Mechanical Attributes of the Waste Package Environment	LLNL

# STUDY PLANS CRITICAL TO ESF START-UP

Perched Water Test  
Hydrochemistry Test  
Hydrologic Properties of Major Faults Encountered in  
Main Test Level of ESF

Geologic Mapping of the Exploratory Shaft and Drifts

Water Movement Test/CI 36 (LANL-In review)

E560000ft

E564000ft

E568000ft

USW UZ-1

UE-25 WT#18

USW G-1

USW H-1

Nellis Air Force Range  
Nevada Test Site

UE-25 UZ#4

UE-25 RF#7A

UE-25 WT#4

UE-25 UZ#5

7/94

UE-25a #4

PERIMETER DRIFT BOUNDARY

USW H-5

TS NORTH DRIFT

UE-25a #5

UE-25a #7

UE-25 NRG-1

UE-25a #6

USW G-4

UE-25b #1

UE-25 RF#8

UE-25 RF#10

9/94 - 6/96

TS WEST DRIFT

TS MAIN DRIFT

TS EAST DRIFT

CH DECISION DATE 2/96  
START THERMAL TEST 4/96

2/95-2/96

USW H-4

USW UZ-7  
USW UZ-8  
USW WT-2

USW UZ-6s  
USW UZ-6

7/95

Bureau of Land Management  
Nevada Test Site

UE-25 RF#5

TS SOUTH DRIFT

USW H-3

UE-25c #1  
UE-25c #3  
UE-25c #2

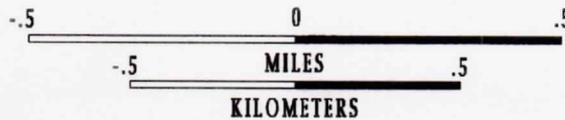
3/96

N768000ft

N764000ft

N760000ft

N756000ft



*Existing boreholes*

E560000ft

E564000ft

E568000ft

N768000ft

N764000ft

N760000ft

N756000ft

USW UZ-14  
USW WT-23

USW WT-9

PERIMETER DRIFT BOUNDARY

Nellis Air Force Range  
Nevada Test Site

USW SD-1

7/94

USW SD-2

UE-25 NRG-5

USW NRG-6

UE-25 NRG-4

TS NORTH DRIFT

UE-25 NRG-3

UE-25 PH#1a

UE-25 PH#1b

UE-25 NRG-2

3/94

UE-25 RF#6

UE-25 RF#12

TS WEST DRIFT

USW SD-3

TS MAIN DRIFT

9/94 - 6/96

USW SD-4

USW SD-5

TS EAST DRIFT

2/95-2/96

CH DECISION DATE 2/96  
START THERMAL TEST 4/96

USW H-7

USW WT-8

USW SD-6

USW SD-8

UE-25 SD#9

UE-25 UZ#9

UE-25 UZ#9a

UE-25 UZ#9b

UE-25 VSP-2(UZ-16)

USW SD-10

USW SD-11

USW SD-12

USW UZ-2

7/95

UE-25 VSP-1(UZ-15)

USW UZ-3

USW SRG-5

USW SD-7

Bureau of Land Management  
Nevada Test Site

USW SRG-4

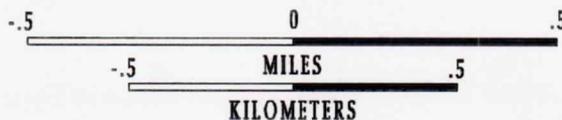
TS SOUTH DRIFT

USW SRG-3

UE-25 SRG-2

UE-25 SRG-1

3/96



Proposed  
boreholes

EG&G YMP-92-233.1

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