

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

**PRESENTATION TO  
THE NUCLEAR WASTE TECHNICAL REVIEW BOARD**

**SUBJECT: EXPLORATORY STUDIES  
FACILITY (ESF) DESIGN  
REVIEW STATUS**

**PRESENTER: DR. R. L. BULLOCK**

**PRESENTER'S TITLE  
AND ORGANIZATION: TECHNICAL PROJECT OFFICER  
RAYTHEON SERVICES NEVADA  
LAS VEGAS, NEVADA**

**PRESENTER'S  
TELEPHONE NUMBER: (702) 794-7014**

**SEPTEMBER 18 - 19, 1991**

# **STATUS OF THE DESIGN STUDY AND THE DESIGN STUDY REVIEWS**

- **REVIEW OF CRITERIA FOR THE DESIGN STUDY**
- **REVIEW OF THE SOUTH AREA FACILITIES IN THE  
DESIGN STUDY**
- **PURPOSE, CRITERIA AND SCHEDULE OF THE DESIGN  
REVIEWS**
- **REVIEWERS**
- **REVIEWED DOCUMENTS**
- **REVIEW RESULTS**
- **SUMMARY**

# **STATUS OF DESIGN STUDY**

- **THIS IS A PRELIMINARY DESIGN, THE EQUIVALENT TO THE DETAIL OF THE TITLE I DESIGN. SUBSTANTIAL WORK IS NEEDED BEFORE FINALIZATION OF DESIGN AND CONSTRUCTION STARTS. THIS WORK WILL BE DONE IN TITLE II**

# **IMPORTANCE OF THE DESIGN STUDY**

- **PROVIDES THE PRELIMINARY ENGINEERING DESIGN THAT ALLOWS THE TITLE I DESIGN SUMMARY REPORT (DSR) TO BE REVISED. THIS DESIGN STUDY THEN FORMS THE BASIS FOR THE NEW TITLE II DESIGN**

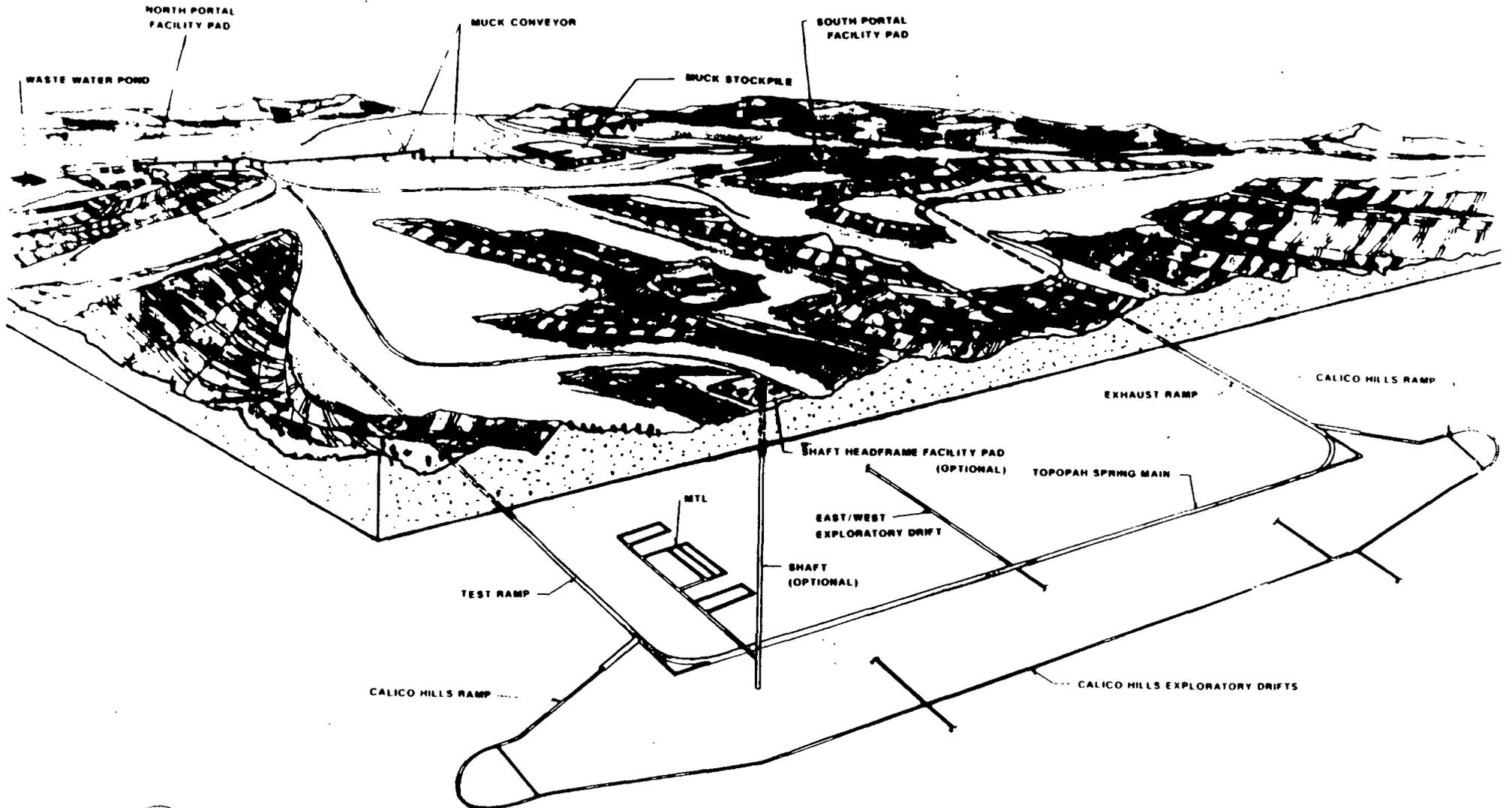
# **PROJECT LEVEL/PROJECT OFFICE CRITERIA AND REQUIREMENTS USED IN THE DESIGN STUDY**

- **PROCEDURES FOR CONSTRUCTION MANAGEMENT -  
CHAPTER V - DOE ORDER 4700.1**
- **PROJECT MANAGEMENT SYSTEM - DOE ORDER 4700.1**
- **GENERAL DESIGN CRITERIA MANUAL - DOE ORDER 6430.1**
- **EXPLORATORY STUDIES FACILITY DESIGN REQUIREMENTS  
(ESFDR) AND APPLICABLE APPENDICES**
- **YUCCA MOUNTAIN GEOLOGIC DISPOSAL SYSTEM  
DESCRIPTION (SD)**
- **SPECIFIC OPERATING CONTRACTOR (REECO)  
REQUIREMENTS (DESIGN/REVIEW)**
- **APPLICABLE NATIONAL, NEVADA AND LOCAL CODES,  
STANDARDS AND GUIDES**
- **REPOSITORY DESIGN REQUIREMENTS**

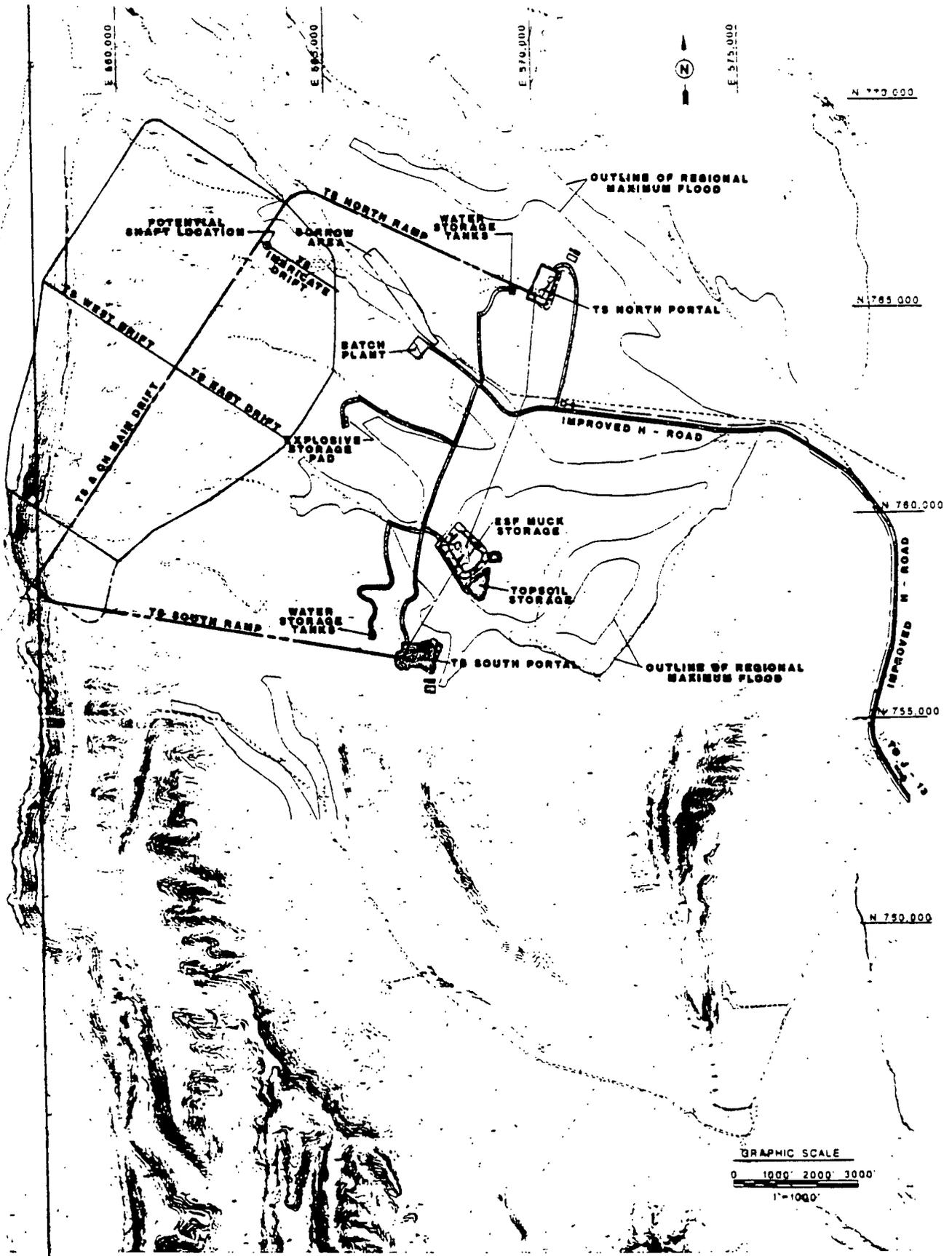
# DESIGN STUDY PARTICIPANTS

- LANL (TESTING)
- USGS (RAMP DRILLING/SOIL AND ROCK STUDY)
- USBR (GEOLOGICAL ENGINEERING)
- SAIC (GEOTECHNICAL)
- SNL (PERFORMANCE ASSESSMENT/WATER AND SEALS)
- PARSONS-BRINKERHOFF (PB) (REPOSITORY INTERFACE)

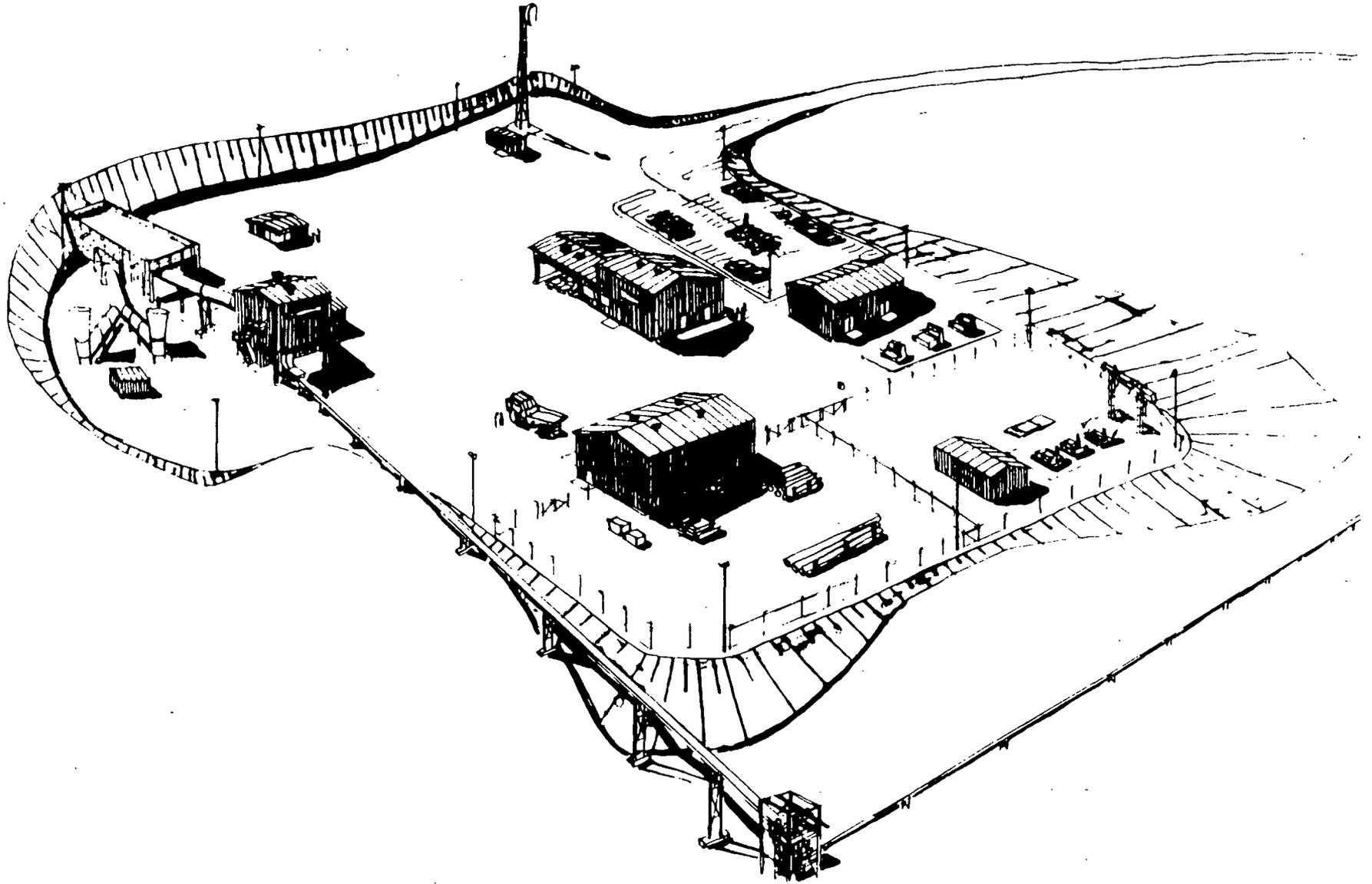
# TITLE I ESF DESIGN (LOOKING SOUTH)



# EXPLORATORY STUDIES FACILITY GENERAL ARRANGEMENT



# SOUTH PORTAL PAD



# **SOUTH PORTAL SURFACE BOUNDARY RIDGE NO GEOLOGIC FAULTING**

- **ELEVATION OF 3,930 FT**
  - 8.0 ACRES
- **H - ROAD IMPROVEMENTS**
  - 36 FT WIDE
  - 4,000 FT LONG
  - TYPE I
- **PORTAL ACCESS ROAD**
  - 36 FT WIDE
  - 6,885 FT LONG
  - TYPE I
- **69 KV TRANSMISSION LINE NOW APPROVED; 138 KV  
TRANSMISSION LINE AFTER CANYON STATION  
UPGRADE**

# **WATER PROVISIONS**

- **FROM BOOSTER PUMP STATION**
  - 6" PVC LINE
  - 10,800 FT LONG
- **POTABLE WATER STORAGE TANK**
  - 50,000 U.S. GALLONS
- **FIRE SUPPRESSION WATER TANK**
  - 200,000 U.S. GALLONS

# WASTE WATER PROVISIONS

- **WASTE WATER POND**
  - 1.5 ACRES
  - 10.0 ACRE-FEET
  - IMPERVIOUS LINER
  
- **SEPTIC TANK**
  - 2 - 5,000 U.S. GALLON TANKS\*
  
- **LEACH FIELD**

\* FINAL LOCATION TBD IN TITLE II BY PERFORMANCE ASSESSMENT  
ESTABLISHING SAFE PERIMETER DISTANCE FROM BLOCK

# **SURFACE MATERIAL HANDLING SYSTEM**

- **CONVEYORS TO STOCKPILE**
  - **ENCLOSED**
  - **WIDTH 36"**
  - **CAPACITY 850 TONS/HR**
  - **LENGTH 4,000 FT**
  
- **INSPECTION ROAD**
  - **12 FT WIDE**
  - **4,000 FT**

# **SOUTH RAMP**

- **PROVIDES ACCESS TO**
  - **TOPOPAH SPRING**
  - **CALICO HILLS**
  
- **FUNCTION**
  - **AIR EXHAUST**
  - **MEN AND MATERIAL HANDLING**
  - **GEOTECHNICAL TESTING**

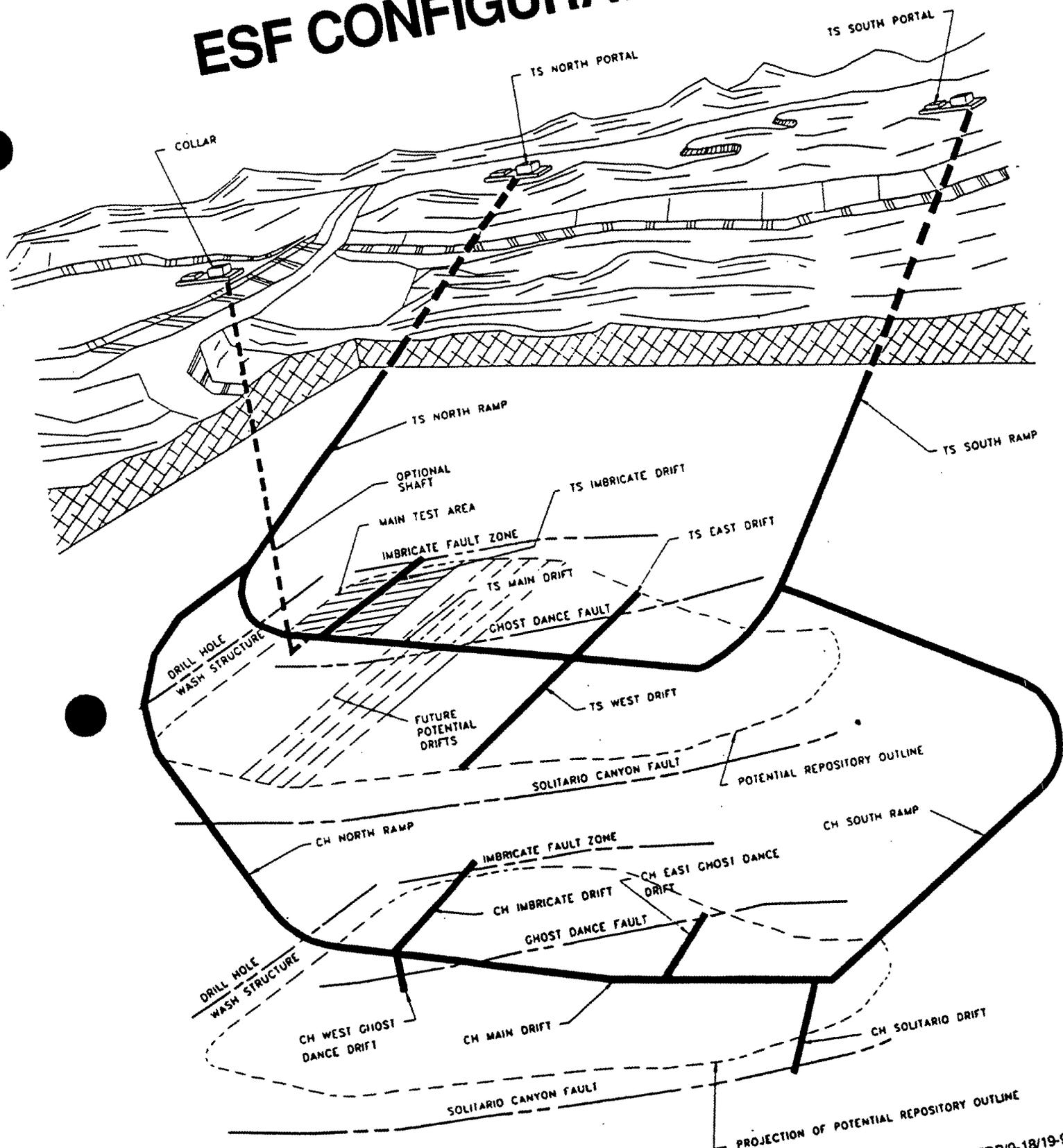
# **SOUTH RAMP - TOPOPAH SPRING**

- **DIAMETER - 25 FT**
- **LENGTH - 9,139 FT**
- **SLOPE - 1.6%**
- **TURNING RAD. - 600 FT**

## **EQUIPMENT**

- **HVAC SYSTEM**
- **CONVEYOR**
- **UTILITIES**

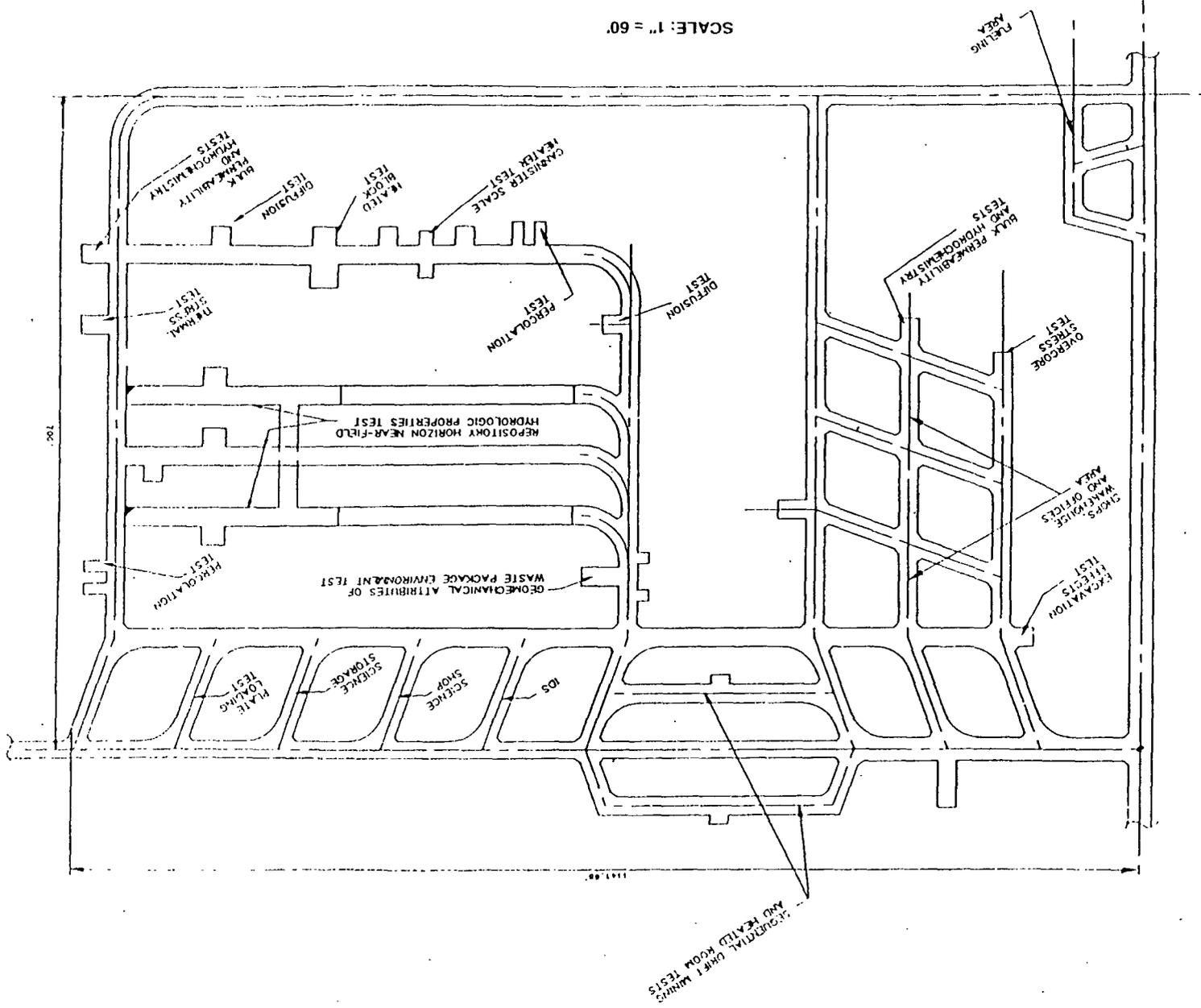
# ESF CONFIGURATION



NOTE: THIS IS PICTORIAL ONLY AND NOT DRAWN TO SCALE

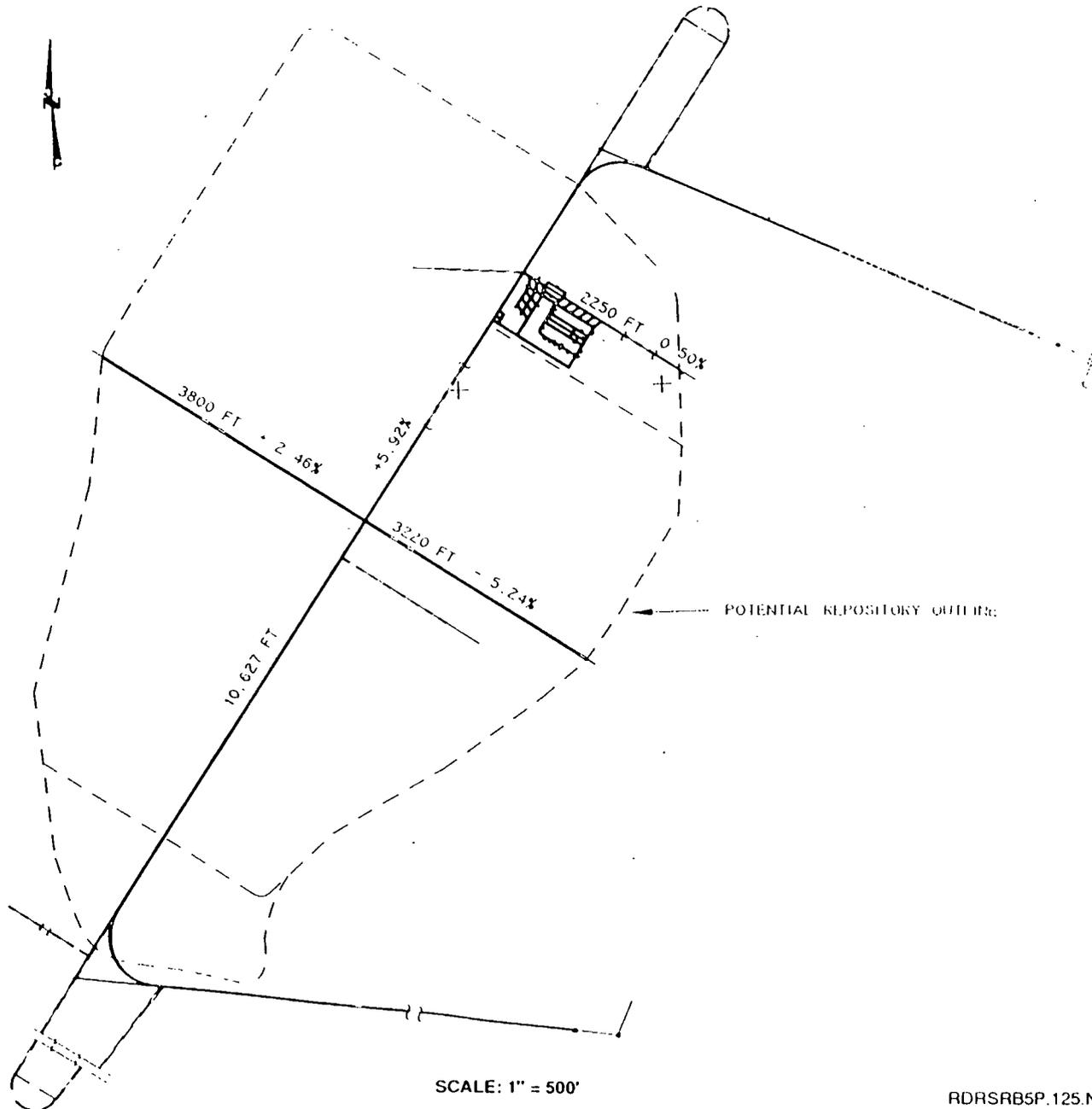
RRDIBSSP.125.NWTRB/9-18/19-91

# TS MAIN TEST AREA PLAN



SCALE: 1" = 60'

# SUBSURFACE ACCESS GENERAL ARRANGEMENT PLAN



SCALE: 1" = 500'

# HVAC SYSTEM

- FLOW THROUGH VENTILATION
- TOTAL INTAKE AIR - 400,000 CFM
- MAIN FAN MOTOR - 70 BHP
- STATIC PRESSURE - 7" W.G.

## TOPOPAH SPRING

- 285,000 CFM
- ASSISTED BY AUXILIARY FANS

## CALICO HILLS

- 115,000 CFM
- ASSISTED BY AUXILIARY FANS

# **MANAGEMENT REVIEW**

**PURPOSE: TO DEVELOP CONSENSUS AGREEMENT ON THE DESIGN FROM THOSE WHO CONTRIBUTED TO IT AND TO THE LEVEL OF DETAIL PRESENTED IN THE DESIGN, TO ASSURE THAT THE DESIGN IS IN COMPLIANCE WITH THE UPPER TIER REQUIREMENTS**

# **INDEPENDENT TECHNICAL REVIEW**

**PURPOSE: TO GAIN AN INDEPENDENT VIEW OF WHETHER OR NOT THE PRELIMINARY DESIGN AT THAT LEVEL OF DETAIL IS MEETING THE DESIGN CRITERIA AND PURPOSE OF THE ESF**

# REVIEW CRITERIA

**CONSIDER THE FOLLOWING LIST OF PARAMETERS FOR WHICH THIS DESIGN MUST BE CONSISTENT AND WHETHER OR NOT THE PARAMETERS CAN BE IMPLEMENTED INTO THE DESIGN:**

- **APPLICABLE NUCLEAR REGULATORY ISSUES**
- **SITE CHARACTERIZATION TESTS**
- **MSHA & OSHA REGULATIONS**
- **RELIABILITY, MAINTAINABILITY AND OPERABILITY**
- **CONSTRUCTABILITY**
- **DETAILED STRESS AND THERMAL LOADING**
- **ENVIRONMENTAL COMPLIANCE**
- **SOCIOECONOMIC ISSUES**

# **SCHEDULE FOR ESF DESIGN STUDY**

<b>JUNE 3, 1991</b>	<b>MANAGEMENT NORTH AREA REVIEW</b>
<b>JUNE 17, 1991</b>	<b>INDEPENDENT TECHNICAL NORTH AREA REVIEW</b>
<b>JULY 29, 1991</b>	<b>MANAGEMENT SOUTH AREA REVIEW</b>
<b>AUGUST 12, 1991</b>	<b>INDEPENDENT TECHNICAL SOUTH AREA REVIEW</b>
<b>AUGUST 26, 1991</b>	<b>SUBMIT BOTH NORTH AND SOUTH AREA PACKAGES TO DOE/YMP FOR AN INTERNAL QMP-06-04 REVIEW</b>
<b>SEPTEMBER 3, 1991</b>	<b>SUBMIT TO DOE/OCRWM FOR APPROVAL</b>

# MANAGEMENT REVIEWERS

<b>PROJECT OFFICE</b>	<b>(PO)</b>
<b>SANDIA NATIONAL LABORATORIES</b>	<b>(SNL)</b>
<b>LOS ALAMOS NATIONAL LABORATORY</b>	<b>(LANL)</b>
<b>U. S. GEOLOGICAL SURVEY</b>	<b>(USGS)</b>
<b>U. S. BUREAU OF RECLAMATION</b>	<b>(USBR)</b>
<b>REYNOLDS ELECTRICAL AND ENGINEERING CO.</b>	<b>(REECO)</b>
<b>SCIENCE APPLICATIONS INTERNATIONAL CORP.</b>	<b>(SAIC)</b>
<b>PROJECT OFFICE, QUALITY ASSURANCE</b>	
<b>NWMS M&amp;O/TRW</b>	

# INDEPENDENT TECHNICAL REVIEW

## ● TECHNICAL REVIEWERS

- CIVIL RSN CENTRAL ENGINEERING
- ELECTRICAL RSN CENTRAL ENGINEERING
- MECHANICAL RSN CENTRAL ENGINEERING
- MINING NEW RSN EMPLOYEE
- STRUCTURAL RSN CENTRAL ENGINEERING
- TESTING SUPPORT LANL TEST MANAGER
- PERFORMANCE ASSESSMENT SNL
- QA PROJECT OFFICE
- CONSTRUCTION REECO
- REPOSITORY INTERFACE TRW & PB
- MAINTAINABILITY/OPERABILITY T&MSS
- ENVIRONMENTAL T&MSS
- REGULATORY T&MSS
- SAFETY RSN SAFETY DEPARTMENT
- DECISION ANALYST STRATEGIC INSIGHT
- GEOLOGY T&MSS
- HYDROLOGY USBR

# **INDEPENDENT TECHNICAL REVIEW**

(CONTINUED)

## ● **OBSERVERS**

- **DOE/YMPO**
- **OCRWM/WESTON**
- **DOE/NTSO**
- **MSHA**
- **USBM**
- **STATE OF NEVADA**
- **COUNTIES**
- **NWTRB REPRESENTATIVE**
- **NRC REPRESENTATIVE**

# NUMBER OF REVIEWERS

<b>JUNE 3, 1991</b>	<b>MANAGEMENT REVIEW</b>	<b>14 REVIEWERS</b>
<b>JUNE 17, 1991</b>	<b>INDEPENDENT TECHNICAL REVIEW</b>	<b>16 REVIEWERS*</b>
<b>JULY 29, 1991</b>	<b>MANAGEMENT REVIEW</b>	<b>18 REVIEWERS</b>
<b>AUGUST 12, 1991</b>	<b>INDEPENDENT TECHNICAL REVIEW</b>	<b>21 REVIEWERS*</b>
<b>AUGUST 26, 1991</b>	<b>YMP/DOE QMP-06-04 REVIEW</b>	<b>5 REVIEWERS</b>

\* ADDITIONALLY, THERE WERE APPROXIMATELY 20 OBSERVERS WHO COMMENTED THROUGH THE PROJECT OFFICE

# DRAWINGS

	NORTH AREA REVIEW	SOUTH AREA REVIEW	TOTAL DESIGN STUDY
● CIVIL	34	20	54
● ELECTRICAL	13	18	31
● MECHANICAL	13	11	24
● MINING	11	42	53
● STRUCTURAL/ARCHITECTURAL	21	21	42
● POTENTIAL REPOSITORY INTERFACE	-	-	6
<b>TOTAL</b>	<b>92</b>	<b>112</b>	<b>210</b>

# **STUDIES/ANALYSES/CALCULATIONS REVIEWED DURING SOUTH AREA REVIEW**

- **PRELIMINARY OPENING STABILITY ANALYSIS**
- **RAMP SIZING - TS SOUTH RAMP**
- **RAMP SIZING - CH SOUTH RAMP**
- **PRELIMINARY VENTILATION ANALYSIS**
- **DEVELOPMENT VENTILATION ANALYSIS**
- **UNDERGROUND WATER DISTRIBUTION SYSTEM ANALYSIS**
- **UNDERGROUND WASTE WATER COLLECTION SYSTEM ANALYSIS**
- **COMPRESSED AIR DISTRIBUTION SYSTEM ANALYSIS**
- **PRELIMINARY SOILS/ROCK REPORT (USGS/USBR)**

# **DESIGN SUMMARY REPORT, REV. 1**

- **PROVIDES GENERAL DESCRIPTION OF EXPLORATORY STUDIES FACILITY**
- **PROVIDES BASIS FOR DECISION TO PROCEED TO TITLE II DESIGN**
- **COMPRISED OF FIVE VOLUMES**

# VOLUME I, NARRATIVE REPORT

- EXECUTIVE SUMMARY
- CHAPTER 1 INTRODUCTION
- CHAPTER 2 GEOLOGY
- CHAPTER 3 PROJECT DESCRIPTION
- CHAPTER 4 ENVIRONMENTAL ASPECTS
- CHAPTER 5 SAFETY AND HEALTH ASPECTS
- CHAPTER 6 DESIGN ASPECTS
- CHAPTER 7 ESF/POTENTIAL REPOSITORY INTERFACES,  
DESIGN CRITERIA AND REQUIREMENTS,  
AND NRC CONCERNS
- CHAPTER 8 ESF CLOSURE AND DECOMMISSIONING
- CHAPTER 9 LONG-LEAD PROCUREMENT ITEMS
- CHAPTER 10 TITLE II DESIGN
- CHAPTER 11 CONSTRUCTION
- CHAPTER 12 OPERATIONS AND TESTING
- CHAPTER 13 SCHEDULES
- CHAPTER 14 COST ESTIMATES

# **VOLUME 2, TECHNICAL DESIGN ANALYSIS**

## **CHAPTER 15 NORTH PORTAL AREA**

- 15.1 ST-MN-001, TS NORTH PORTAL SITING ANALYSIS**
- 15.2 ST-MN-002, SOUTH RAMP SITING ANALYSIS**
- 15.3 ST-MN-003, OPTIONAL SHAFT SITING ANALYSIS**
- 15.4 ST-MN-004, PRELIMINARY SITING ANALYSIS**
- 15.5 ST-MN-006, PRELIMINARY SIZING OF OPTIONAL SHAFT**
- 15.6 ST-MN-007, PRELIMINARY TS NORTH ACCESS RAMP  
CROSS SECTION SIZE ANALYSIS**
- 15.7 ST-MN-008, CALICO HILLS NORTH RAMP SIZING STUDY**
- 15.8 ST-MN-010, PRELIMINARY UNDERGROUND  
TRANSPORTATION METHODS ANALYSIS**
- 15.9 ST-MN-015, PRELIMINARY ESF FUNCTIONAL  
REQUIREMENTS ANALYSIS**
- 15.10 ST-MN-020, ESF PRELIMINARY EXCAVATION PLAN**

# **VOLUME 2, TECHNICAL DESIGN ANALYSIS**

(CONTINUED)

## **CHAPTER 15 SOUTH PORTAL AREA**

- 15.11 ST-ME-001, UNDERGROUND WATER DISTRIBUTION SYSTEM ANALYSIS**
- 15.12 ST-ME-006, UNDERGROUND WASTE WATER COLLECTION SYSTEM ANALYSIS**
- 15.13 ST-ME-011, COMPRESSED AIR DISTRIBUTION SYSTEM ANALYSIS**
- 15.14 ST-MN-025, TS SOUTH RAMP SIZING STUDY**
- 15.15 ST-MN-026, CALICO HILLS SOUTH RAMP SIZING STUDY**
- 15.16 ST-MN-030, PRELIMINARY VENTILATION ANALYSIS - ESF CONSTRUCTION PHASE**
- 15.17 ST-MN-031, PRELIMINARY VENTILATION ANALYSIS - ESF OPERATION PHASE**
- 15.18 ST-MN-035, PRELIMINARY OPENING STABILITY ANALYSIS**

# **VOLUME 3, DESIGN DRAWINGS**

**CHAPTER 16    ESF REFERENCE DESIGN STUDY  
DRAWINGS**

# **VOLUME 4, OUTLINE SPECIFICATIONS**

**CHAPTER 17    ESF TITLE I OUTLINE  
SPECIFICATIONS**

# VOLUME 5, APPENDICES

- 5.1 "FINDINGS OF THE ESF ALTERNATIVES STUDY," SAND90-3232
- 5.2 LETTER, GERTZ TO BULLOCK, DATED 2/22/91, "AUTHORIZATION FOR CONDUCTING A DESIGN STUDY TO DEVELOP A REFERENCE EXPLORATORY SHAFT FACILITY (ESF) DESIGN TO BE USED AS INPUT TO TITLE I DESIGN SUMMARY REPORT"
- 5.3 "EXPLORATORY SHAFT FACILITY DESIGN REQUIREMENTS," VOLUMES 1 AND 2, YMP/CC-0013
- 5.4 "REFERENCE INFORMATION BASE," YMP/CC-0002
- 5.5 "SITE CHARACTERIZATION PROGRAM BASELINE," YMP/CM-0011
- 5.6 YUCCA MOUNTAIN ADMINISTRATIVE PROCEDURE AP-5.19Q, INTERFACE CONTROL
- 5.7 "SYNOPSIS OF PAST STABILITY ANALYSES FOR THE ESF TITLE I DESIGN"
- 5.8 "PRELIMINARY EVALUATION: THREE-DIMENSIONAL FAR-FIELD ANALYSIS FOR THE EXPLORATORY SHAFT FACILITY"

# **VOLUME 5, APPENDICES**

(CONTINUED)

- 5.9 "TECHNICAL LETTER MEMORANDUM RSI(ALO)-0037"**
- 5.10 "DRIFT DESIGN METHODOLOGY AND PRELIMINARY APPLICATION FOR THE YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT," SAND89-0387**
- 5.11 HOLMES & NARVER, INC., NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS, EXPLORATORY SHAFT FACILITY, "LIFE SAFETY SYSTEMS STUDY 61," REV. 2**
- 5.12 HOLMES & NARVER, INC., NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS, EXPLORATORY SHAFT FACILITY, "COMMUNICATIONS SYSTEMS, SPECIAL STUDY 6B," REV. 1**
- 5.13 DRAFT "PRELIMINARY SAFETY ANALYSIS REPORT FOR THE YUCCA MOUNTAIN PROJECT ESF AND SITE CHARACTERIZATION PROGRAM," REV. 1**
- 5.14 "EXPLORATORY STUDIES FACILITY COST ESTIMATE"**

# RESULTS OF MANAGEMENT REVIEW NORTH PORTAL AREA

## ● NUMBER OF COMMENTS

- DRAWINGS	250
- TRADE STUDIES	76
- DESIGN SUMMARY REPORT	<u>164</u>
TOTAL	490*

## ● ANALYSIS OF COMMENTS

- APPLICABLE TO TITLE I DETAIL	337**
- APPLICABLE TO TITLE II DETAIL	153

\* ALL COMMENTS REACHED RESOLUTION  
ALL ACCEPTED COMMENTS ON DELIVERABLE DOCUMENTS  
WERE INCORPORATED

\*\* 64 COMMENTS REQUIRED NO CHANGE IN DESIGN

# **RESULTS OF MANAGEMENT REVIEW NORTH PORTAL AREA**

(CONTINUED)

## **EXAMPLES OF APPROPRIATE MINOR COMMENTS**

- **THE FIRE PLUG SHOULD BE 45 FEET FROM THE BUILDING PER NTS CODE**
- **WATER SPRAYS ARE NEEDED AT TRANSFER POINTS BETWEEN CONVEYORS**

## **EXAMPLES OF APPROPRIATE SIGNIFICANT COMMENTS**

- **RE-STUDY LOCATION OF WATER TANK AND BORROW PIT LOCATION IN REFERENCE TO THE SITE CHARACTERIZATION AREA**
- **RE-EVALUATE PROBABLE MAXIMUM FLOOD DATA BASED ON VARIOUS CONFIDENCE LEVELS AND MOST RECENT FINDINGS**

**ADDED TRADE STUDIES RESULTING FROM REVIEW - NONE**

# RESULTS OF TECHNICAL REVIEW NORTH PORTAL AREA

## ● NUMBER OF COMMENTS

- DRAWINGS	102
- TRADE STUDIES	128
- DESIGN SUMMARY REPORT	<u>116</u>
TOTAL	346*

## ● ANALYSIS OF COMMENTS

- APPLICABLE TO TITLE I DETAIL	252**
- APPLICABLE TO TITLE II DETAIL	94

\* ALL COMMENTS REACHED RESOLUTION  
ALL ACCEPTED COMMENTS ON DELIVERABLE DOCUMENTS  
WERE INCORPORATED

\*\* 29 COMMENTS REQUIRED NO CHANGE IN DESIGN

# **RESULTS OF TECHNICAL REVIEW NORTH PORTAL AREA**

(CONTINUED)

## **EXAMPLES OF APPROPRIATE MINOR COMMENTS**

- **4-WHEEL DRIVE TRUCK IS NOT NEEDED FOR THE GRADES SPECIFIED - 2-WHEEL DRIVE IS ADEQUATE**
- **LINE WEIGHTS ON DRAWING SHOULD BE VARIED**
- **15° CONVEYOR INCLINATION AT THE PORTAL IS TOO STEEP - CHANGE TO 13° MAXIMUM**

## **EXAMPLES OF APPROPRIATE SIGNIFICANT COMMENTS**

- **IT IS STATED THAT THE GRADES OF RAMPS SHALL BE 10% (MAXIMUM) ON STRAIGHT SECTIONS AND 6% ON CURVED SECTIONS. SINCE THE NORTH RAMP MAY BE USED FOR FUTURE WASTE RAMP AND CONSIDERING NORMAL SAFETY PRECAUTIONS, CONCERN IS EXPRESSED TOWARDS THIS RELATIVELY HIGH GRADE**

## **ADDED TRADE STUDIES RESULTING FROM REVIEW - TWO**

- **FUTURE ANALYSIS OF NORTH RAMP GRADES BETWEEN 5 AND 10%**
- **ADDITIONAL SITE SCREENING ANALYSIS FOR NORTH RAMP LOCATION**

# RESULTS OF MANAGEMENT REVIEW SOUTH PORTAL AREA

## ● NUMBER OF COMMENTS

- DRAWINGS	178
- TRADE STUDIES	42
- DESIGN SUMMARY REPORT	169
- REPOSITORY INTERFACE DRAWINGS	21
- OUTLINE SPECIFICATIONS	<u>84</u>
TOTAL	494*

## ● ANALYSIS OF COMMENTS

- APPLICABLE TO TITLE I DETAIL	214**
- APPLICABLE TO TITLE II DETAIL	165

\* ALL COMMENTS REACHED RESOLUTION  
ALL ACCEPTED COMMENTS ON DELIVERABLE DOCUMENTS  
WERE INCORPORATED

\*\* 115 COMMENTS REQUIRED NO CHANGE IN DESIGN

# **RESULTS OF MANAGEMENT REVIEW SOUTH PORTAL AREA**

(CONTINUED)

## **EXAMPLES OF APPROPRIATE MINOR COMMENTS**

- **THE LIST OF LONG LEAD PROCUREMENT ITEMS COULD BE REDUCED CONSIDERABLY**
- **DEFINE "UNDERGROUND WORKER" AS MSHA WOULD, E.G., "AUTHORIZED PERSON"**

## **EXAMPLES OF APPROPRIATE SIGNIFICANT COMMENTS**

- **MAXIMUM PROBABLE FLOOD DISCUSSIONS MUST BE CONSISTENT IN THE REFERENCE BASIS CITED**
- **INCORPORATE INTO DSR A DISCUSSION OR SCHEMATIC SHOWING THE TRANSITION OF THE ESF TITLE I DESIGN FROM SHAFTS TO RAMPS**

# RESULTS OF TECHNICAL REVIEW SOUTH PORTAL AREA

## ● NUMBER OF COMMENTS

- DRAWINGS	195
- TRADE STUDIES	78
- DESIGN SUMMARY REPORT	86
- REPOSITORY INTERFACE DRAWINGS	22
- OUTLINE SPECIFICATIONS	<u>71</u>
TOTAL	452*

## ● ANALYSIS OF COMMENTS

- APPLICABLE TO TITLE I DETAIL	218**
- APPLICABLE TO TITLE II DETAIL	234

\* ALL COMMENTS REACHED RESOLUTION  
ALL ACCEPTED COMMENTS ON DELIVERABLE DOCUMENTS  
WERE INCORPORATED

\*\* 65 COMMENTS REQUIRED NO CHANGE IN DESIGN

# **RESULTS OF MANAGEMENT REVIEW SOUTH PORTAL AREA**

(CONTINUED)

## **EXAMPLES OF APPROPRIATE MINOR COMMENTS**

- **PROVIDE FREEZE PROTECTION FOR AMBULANCE PARKED IN AMBULANCE AREA**
- **BURY UTILITY LINES DEEP ENOUGH TO PREVENT FREEZING**

## **EXAMPLES OF APPROPRIATE SIGNIFICANT COMMENTS**

- **RECOMMEND METHOD OF CONVEYOR SUSPENSION SHOULD BE EVALUATED TO ASSURE CURRENT APPROACH IS SUITABLE FOR THE PROPOSED APPLICATION**
- **SIZING OF WATER SUPPLY LINE SERVICES UNDERGROUND SHOULD BE EVALUATED TO ASSURE ADEQUATE SUPPORT OF EXPECTED TESTS AND UNDERGROUND OPERATIONS, INCLUDING FIRE PROTECTION SYSTEM**

# **SUMMARY OF DESIGN STUDY**

**BY LETTER, DATED MARCH 4, 1991, THE A/E WAS AUTHORIZED TO DEVELOP AN ENGINEERING PLAN FOR THE DESIGN STUDY. AS PART OF THIS TASK, THE A/E**

- **DEVELOPED 210 PRELIMINARY LEVEL DRAWINGS**
- **DEVELOPED 20 PRELIMINARY TRADE STUDIES/ANALYSES**
- **DEVELOPED 101 OUTLINE SPECIFICATIONS**
- **REVISED 14 CHAPTERS OF THE TITLE I DESIGN SUMMARY REPORT WHICH INCLUDED A PRELIMINARY CONSTRUCTION COST ESTIMATE OF THE ESF DESIGN AND 14 APPENDICES SECTIONS**
- **PERFORMED FOUR MANAGEMENT AND INDEPENDENT TECHNICAL REVIEWS WHICH ENCOURAGED COMMENTS FROM AN AVERAGE OF 26 COMMENTORS PER REVIEW. THESE COMMENTORS PRODUCED 1783 COMMENTS. ALL COMMENTS REACHED A RESOLUTION WITH THE COMMENTING ORGANIZATION**
- **REVISED THE TITLE I PRELIMINARY SAFETY ANALYSIS REPORT**
- **SUBMITTED ALL THE RSN APPROVED DELIVERABLES TO THE PROJECT OFFICE ON 9/3/91, THE MILESTONE OBJECTIVE DATE**

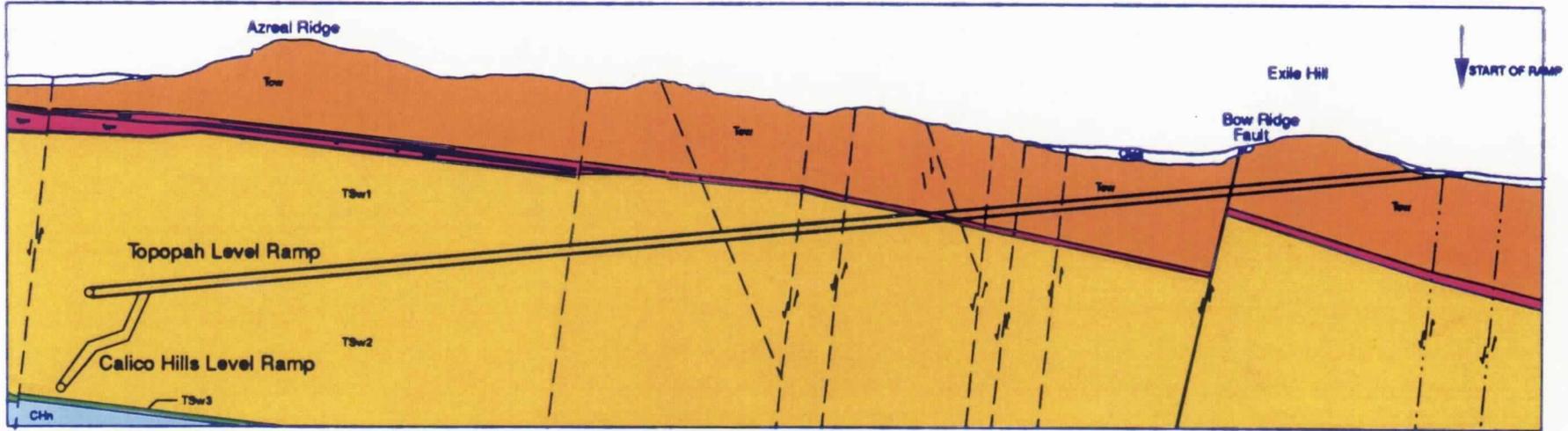
# **ESF TITLE II SITE PREPARATION DESIGN PLANNED FOR FY 1992**

- **FINALIZATION OF THE LOCATION OF THE PORTAL**
- **AREA DESIGN SUFFICIENT FOR RIPPING, BLASTING AND SITE GRADING**
- **PORTAL DESIGN SUFFICIENT FOR BLASTING (IF REQUIRED)**
- **TOPSOIL AND SUBSOIL STORAGE AREA**
- **WASTE WATER STORAGE AREA**
- **POTABLE AND INDUSTRIAL WATER DISTRIBUTION SYSTEM**
- **ELECTRICAL SUBSTATION SIZING**
- **FACILITY LAYOUTS**
- **BUILDING ENVELOPES**
- **OPERATIONS PLAN**
- **MAINTENANCE PLAN**
- **SAFETY ANALYSIS REPORT ON THAT WHICH IS DESIGNED**
- **VALUE ENGINEERING REPORT**
- **ASSOCIATED PERFORMANCE ASSESSMENT RELATED TO DESIGN**

# NORTH RAMP

NW

SE



## Thermal/Mechanical Units

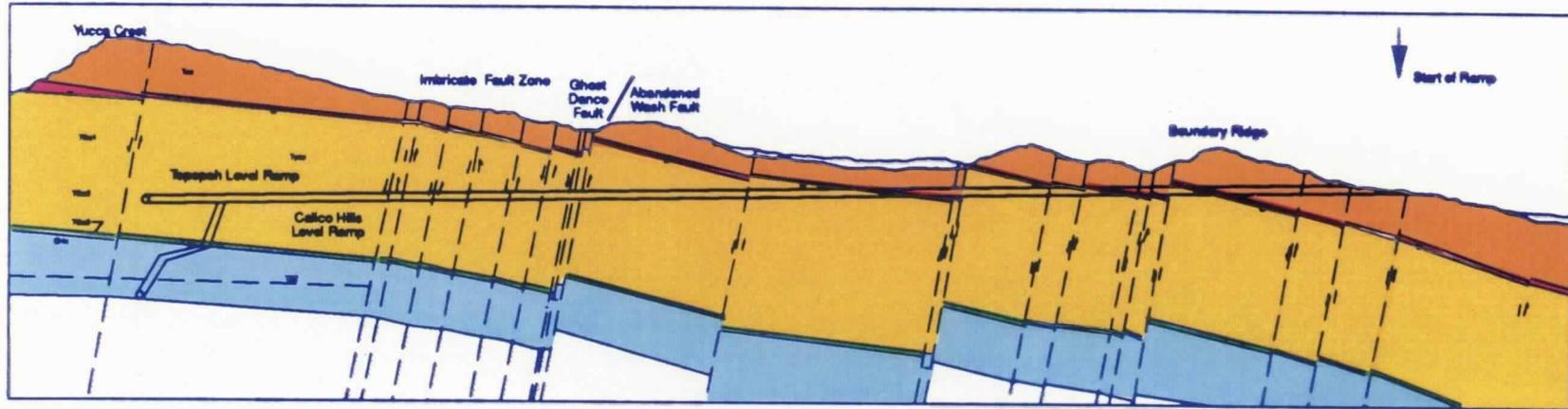
Tcw		Tiva Canyon Member
PTn		Yucca Mountain Member Pah Canyon Member
TSw1 TSw2		Topopah Springs Member
TSw3		Topopah Springs Member
CHn		Tuffaceous Beds of Calico Hills
TZZ		Zeolite-Vitric Contact in Calico Hills (TZZ) (Not Present on This Section)

*Conceptual Illustration  
Not To Scale*

# SOUTH RAMP

NW

SE



## Thermal/Mechanical Units

Tcw		Tiva Canyon Member
PTn		Yucca Mountain Member Pah Canyon Member
TSw1 TSw2		Topopah Springs Member
TSw3		Topopah Springs Member
CHn		Tuffaceous Beds of Calico Hills
TZZ		Zeolite-Vitric Contact in Calico Hills (TZZ)
Ppw CFUn BFw		Prow Pass Member and Bullfrog Member

*Conceptual Illustration  
Not To Scale*