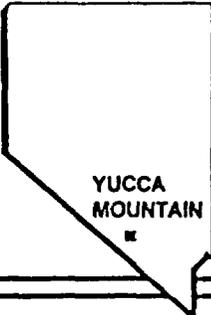


U.S. DEPARTMENT OF ENERGY

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YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

Document No. YMP/CM-0011
Revision 11
CI No. CI.11.0000/CI.13.0000
Date 8/22/94
WBS No. 1.2.3
QA Level Yes

PROJECT BASELINE DOCUMENT

YUCCA MOUNTAIN SITE CHARACTERIZATION PROGRAM BASELINE (SCPB) VOLUME 1

*CHANGES TO THIS DOCUMENT REQUIRE PREPARATION
AND APPROVAL OF A CHANGE REQUEST IN ACCORDANCE
WITH PROJECT AP-3.3Q*



UNITED STATES DEPARTMENT OF ENERGY
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT OFFICE

9409060211 940829
PDR WASTE
WM-11 PDR

ENCLOSURE

1 Document Title:
Site Characterization Program Baseline

2 Document Number:
YMP/CM-0011

NOTE: This document is revised by Section.

The document identified in Blocks 1 and 2 has been changed. The changed pages attached to this DCN are identified in Block 7 opposite the latest DCN number in Block 3. The original issue of this document as modified by all applicable DCN's constitutes the current version of the document identified in Blocks 1 and 2.

3 DCN NO.	4 CR NO.	5 DOCUMENT Rev./ICN #	6 CR TITLE	7 AFFECTED PAGES	CHANGE	ADD	DELETE	8 DATE
0	91/018	0	Initial Issue	All		X		2/22/91
1	91/052	1	Submit SCPB, Rev. 1 for CCB Control (complete revision of information related to ESF design)	All	X			4/5/91
2	91/110	2	Revision to Section 8.3.1.14 of the SCPB to Reflect Updated Plans in Study Plan 8.3.1.14.2	Table of Contents pages iii through xii Pages 8.3.1.14-1 through 8.3.1.14-52	X			10/2/91
3	91/096	3	Surface Dust Suppres- sion water will not be tagged with chemical tracers	Table of Con- tents pages iii through xii for all 5 vols. 8.4.2-87		X		2/07/92
3	91/113	3	Addition of three large hydraulic gradient boreholes to the Yucca Moun- tain SCPB and add map (attachment 1)	8.3.1.2-251 8.3.1.2-253		X X		2/07/92
3	92/009	3	Change in objectives for Activities 1 and 4 of YMP-USGS Study Plan 8.3.1.2.1.4 (Regional Hydrologic System Synthesis and Modeling)	8.3.1.2-124 8.3.1.2-128	X X			
3	92/010	3	Change in title of Study 8.3.1.2.2.2 in SCPB	8.3.1.2-156	X			2/07/92

**YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
DOCUMENT CHANGE NOTICE (DCN) RECORD**

1 Document Title: Site Characterization Program Baseline	2 Document Number: YMP/CM-0011
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The document identified in Blocks 1 and 2 has been changed. The changed pages attached to this DCN are identified in Block 7 opposite the latest DCN number in Block 3. The original issue of this document as modified by all applicable DCN's constitutes the current version of the document identified in Blocks 1 and 2.

3 DCN NO.	4 CR NO.	5 DOCUMENT Rev./ICN #	6 CR TITLE	7 AFFECTED PAGES	CHANGE	ADD	DELETE	8 DATE
3	92/020	3	Change title of activity 8.3.1.2.3.2.3	8.3.1.2-285	X			02/07/92
3	92/021	3	Change in objectives for activity 8.3.1.2.3.2.4 of YMP-USGS Study Plan 8.3.1.3.2 (Saturated zone hydrochemistry)	8.3.1.2-286	X			02/07/92
4	92/018	4	Change in objectives for Activity 8.3.1.2.3.2.3 of YMP-USGS Study Plan 8.3.1.2.3.2	8.3.1.2-285	X			03/13/92
4	92/019	4	Change in objectives for activity 8.3.1.2.3.2.1	8.3.1.2-281	X			03/13/92
5	92/093	5	Change title of activity in SCP 8.3.1.17.4.3.1 to SCP Activity 8.3.1.4.2.1	8.3.1.14-92 thru 8.3.1.17-99	X			07/15/92
6	92/095	6	Change Site Character- ization Program Baseline (SCPB), Revision 6	All ESF related pages	X			07/15/92
7	92/094	7	Change of editorial (editorial corrections) to the SCPB, Sections 8.3.1.4.2.1.2 and 8.3.1.4.2.1.6	8.3.1.4-39 thru 8.3.1.4-54		X		07/15/92

NOTE: This document is revised by section.

1 Document Title: Site Characterization Program Baseline	2 Document Number: YMP/CM-0011
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The document identified in Blocks 1 and 2 has been changed. The changed pages attached to this DCN are identified in Block 7 opposite the latest DCN number in Block 3. The original issue of this document as modified by all applicable DCN's constitutes the current version of the document identified in Blocks 1 and 2.

3 DCN NO.	4 CR NO.	5 DOCUMENT Rev./ICN #	6 CR TITLE	7 AFFECTED PAGES	CHANGE	ADD	DELETE	8 DATE
8	92/110	8	Change SCPB to Separate Man-Made material effects from near-Field Geochemistry	8.3.4.2-1-8.3.5 10-38	X			9/24/92
			Table of Contents change generated by above listed CR	Table of Contents: Changes noted In Revision Column	X			9/24/92
9	92/140	9	revisions to the SCPB	All	X			10/2/92
		NOTE: REVISION 9 STREAMLINES VOLUMES I THROUGH V OF THE SCPB INTO ONE VOLUME.						
10	93/106		REVISIONS TO THE SCPB	Table of Contents 8.0-1 8.3.1-10, 12, 69, 70, 97, 98, 112, 113a, 114, and 129 8.3.3-2 -5 8.3.3-7-12 8.3.5-29-33 8.3.5-56-57 8.3.5-85-101 8.4.2-22-29 8.4.2-43-66 8.4.2.34 - 8.4.2.42	X			1/14/93

**YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
DOCUMENT CHANGE NOTICE (DCN) RECORD**

1 Document Title:
Site Characterization Program Baseline

2 Document Number:
YMP/CM-0011

The document identified in Blocks 1 and 2 has been changed. The changed pages attached to this DCN are identified in Block 7 opposite the latest DCN number in Block 3. The original issue of this document as modified by all applicable DCN's constitutes the current version of the document identified in Blocks 1 and 2.

3 DCN NO.	4 CR NO.	5 DOCUMENT Rev./ICN #	6 CR TITLE	7 AFFECTED PAGES	CHANGE	ADD	DELETE	8 DATE
11	94/227M1	11	Revision to the Site Characterization Program Baseline	Table of Contents 8.3.1-59 to 8.3.1-65 8.3.1-69 to 8.3.1-70 8.3.1-104 8.3.1-105 8.4.2-62 8.4.2-70 8.4.2-79 8.4.2-80 8.4.2-86 8.4.2-90	X X X X X X X X X X			8/3/94

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT CHANGE DIRECTIVE (CD)

SECTION I. IDENTIFICATION

² Title of Change:
Revision to Site Characterization Program Baseline

³ Change Classification:
 0 2
 1 3

SECTION II. DISPOSITION

⁴ CR Disposition:
 Approved Approved with Conditions Disapproved

⁵ Conditions: (if applicable)

Approve with the condition that page XIV of the SCPB revision, reflect a change bar to the left of activity "8.3.1.17.3.1.1" as it was revised/changed. The revision column to this entry should reflect revision "11".

NOTE: This correction was made and was incorporated into the publication ready document.

(Signature) 8/11/94

(See Change Documentation Continuation Page)

⁶ Implementation Direction: (if applicable)

1. This Change Request (CR) to revise the Yucca Mountain Site Characterization Program Baseline (SCPB), YMP/CM-0011, is approved with the conditions listed above in Block 5.
2. The CCB Secretary shall ensure that the Cover Page and the Title Page for Document Number YMP/CM-0011, Revision 11, are prepared.
3. The Document Originator shall provide a Print Ready Copy of YMP/CM-0011, Revision 11, to the CCB Secretary. The document number and revision number

(See Change Documentation Continuation Page 2)

SECTION III. CONCURRENCE

All signatures below constitute procedural compliance. I have read, understood, and complied with Procedure QMP-03-09, Rev. 5, ICN # 1, in accomplishing my responsibilities in this procedure.

⁷ Quality Assurance Organization Concurrence

Name: R. E. Spence
(Print)

Org.: YMQAD
(Print)

Signature: *R. E. Spence*

Date: 8/11/94

⁸ Disposition Authority

Name: J. Russell Dyer
(Print)

Title: CCB Chrprsn
(Print)

Signature: *J. Russell Dyer*

Date: 8/3/94

⁹ CD Effective Date

8/3/94

6 Implementation Direction (continued)

will be identified on each page of the Publication Ready Document YMP/CM-0011, Revision 11. The Document Originator shall also provide a Document Change Notice (DCN) identifying changes made to Document YMP/CM-0011.

4. The CCB Secretary shall ensure that YMP/CM-0011, Revision 11, is prepared in accordance with this Change Directive (CD). The CCB Secretary shall prepare a Controlled Document Issuance Authorization (CDIA) to transmit this CD and YMP/CM-0011, Revision 11 to the Project Document Control Center (DCC) in accordance with AP-1.5Q.
5. Per AP-3.3Q, each Project Participant and Project Office Division Director will complete an Affected Document Notice (ADN) as notification of completion of implementation planning for this CD.
6. The CCB Secretary shall ensure that the Configuration Information System (CIS) and the CCB Document Register are updated to reflect this approved revision of Document YMP/CM-0011, Revision 11.
7. Any changes to Document YMP/CM-0011, Revision 11, will require submittal of a CR to the Project CCB.
8. Upon release of YMP/CM-0011, Revision 11, all Project Participants will be required to use YMP/CM-0011, Revision 11, in performing duties applicable to this document.

8.3.1.8.1.2.1 Activity: Eruptive Effects

Objectives

The objectives of this activity are to reevaluate previous studies of the physical processes of hydrovolcanic and Strombolian eruptions of basaltic magma. These studies will be used to define and describe potential eruption scenarios that assess the radiological consequences of magmatic disruption of the repository. Analog studies will be used to attempt to constrain the amount of waste carried to the surface from a repository that is disrupted by rising magma.

8.3.1.8.1.2.2 Activity: Subsurface effects of magmatic activity

Objectives

The objective of this activity are to evaluate the subsurface effects of emplacement of basalt dikes and intrusive bodies through and adjacent to a potential repository. This study will include an assessment of mechanisms of incorporation of waste in magma, the geometry of basalt intrusions, and coupled effects on waste isolation of basalt intrusions through or near a repository.

8.3.1.8.1.2.3 Magma system dynamics

Objectives

The objectives of this activity are to evaluate the dynamics of basaltic magmatism including tracing the processes of formation of basalt magma through generation in the mantle, ascent through the mantle and crust, potential storage in the mantle and crust, and eruption at the earth's surface. Physically- and mathematically-based models of basaltic processes will be developed as a framework for a process-based assessment of the effects of basaltic magmatic activity on a repository.

8.3.1.8.2 Investigation: Studies to provide information required to evaluate changes in the natural and engineered barrier systems resulting from tectonic processes and events

Purpose and objectives of the investigation

The purpose of this investigation is to compile and synthesize the data necessary for an analysis and assessment of repository performance with respect to the possibility of tectonic processes and events affecting (1) the lifetime of waste packages, (2) the average percolation flux over the repository, (3) elevation of the water table, (4) local fracture permeability and effective porosity, and (5) rock geochemical properties. The study and activities in this investigation will take data gathered by field studies in this and other programs and provide an analysis of the probability of the initiating events and their effects on the features listed in (1) through (5) above, for use in assessing layout and design of the underground facilities. The results of the five planned activities will be of use for Issue 1.1 (Total system performance) in analyzing total system performance of the repository to limit radionuclide releases to the accessible environment.

The investigation will also provide data for use in Issue 1.8 (NRC siting criteria), Issue 1.9 (Higher level findings), and Issue 1.11 (Configuration of underground facilities - postclosure) by evaluating potentially adverse tectonic conditions.

8.3.1.8.2.1 Study: Tectonic effects: evaluations of changes in the natural and engineered barrier systems resulting from tectonic processes and events

The assessment of the probability and effects of tectonic events and processes that could result in adverse effects on waste package lifetime, average percolation flux rate over the repository, elevation of the water table, local fracture permeability and effective porosity, and rock geochemical properties.

8.3.1.8.2.1.1 Activity: Analysis of waste package rupture due to tectonic processes and events

Objectives

The objective of this activity is to collect and synthesize data that can be used to assess the probability and effects of tectonic processes and events that could result in adverse impacts on waste package lifetime and performance.

8.3.1.8.2.1.2 Activity: Analysis of the effects of tectonic processes and events on average percolation flux rates over the repository

Objective

The objective of this activity is to produce analyses and assessments of the probability and effects of tectonic initiating events that may result in changes in the average percolation flux rate at the top of the Topopah Spring welded unit.

8.3.1.8.2.1.3 Activity: Analysis of the effect of tectonic processes and events on the changes in water-table elevation

Objectives

The objective of this activity is to produce analyses and assessments of the probability that tectonic initiating events could result in significant changes in the elevation of the water table, changes in the hydraulic gradient, the creation of discharge points in the controlled area, or the creation of perched aquifers in the controlled area.

8.3.1.8.2.1.4 Activity: Analysis of the effects of tectonic processes and events on local fracture permeability and effective porosity

Objectives

The objective of this activity is to address possible changes in fracture permeability and effective porosity caused by tectonic events and processes.

8.3.1.8.2.1.5 Activity: Analysis of the effects of tectonic processes and events on rock geochemical properties

Objectives

The objectives of this activity is to provide assessments of the initiating events related to local changes in distribution coefficients resulting from tectonic processes and events.

8.3.1.8.2.1.6 Activity: Nature, age, and rate of folding and deformation in the repository horizon

Objectives

This activity has been deleted. An estimate of the rates of high-amplitude, short wavelength drag folding associated with fault displacements that may occur in or near the repository horizon, will be estimated in activity 8.3.1.8.2.1.1.

8.3.1.8.2.1.7 Activity: Assessment of waste package rupture due to folding and deformation

Objectives

This activity has been deleted. An assessment of potential for waste package rupture resulting from high-amplitude, short wavelength drag folding associated with fault displacements that occur in or near the repository horizon, will be provided in activity 8.3.1.8.2.1.1.

8.3.1.8.3 Investigation: Studies to provide information required on changes in unsaturated and saturated zone hydrology due to tectonic events

This investigation has been deleted. The work formerly proposed under this investigation will be performed under Investigation 8.3.1.8.2.

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8.3.1.8.4 Investigation: Studies to provide information required on changes in rock geochemical properties resulting from tectonic processes

This investigation has been deleted. The work formerly proposed for this investigation will be performed under Investigation 8.3.1.8.2.

distribution of basaltic volcanism developed from Activity 8.3.1.8.1.1.2. In addition, the data on the geochemistry of the scoria sequences will also be used to correlate basaltic ash interbedded in trenches with their correct eruptive source.

8.3.1.8.5.1.5 Activity: Geochemical cycles of basaltic volcanic fields

Objectives

The objective of this activity is to determine the time-space geochemical variations of the volcanic fields of the southern Great Basin.

These patterns will be compared with the documented geochemical patterns for the volcanic fields of the Yucca Mountain area. This information will be used to test a model that associates changes in basalt composition, increases in the eruptive frequency of polycyclic eruptions, and decreases in the volume of eruptive activity with the waning or termination stages of basaltic volcanic fields. This model, if valid, supports the idea that the Yucca Mountain area has passed the peak of maximum basaltic volcanic activity. Probability calculations, which are based on the peak rate of activity, could therefore be shown to be a worst-case approach to volcanic risk assessment.

8.3.1.8.5.2 Study: Characterization of igneous intrusive features

The activities in this study will gather data concerning the presence of thermal anomalies in the area and data on the geochemical and physical effects of intrusions on the surrounding rock. The evidence for the presence or absence of thermal anomalies will be used as part of the evaluation of the presence of significant magma bodies in the area and their relation to the probability of future volcanic events. The data on the effects of intrusions on surrounding rocks will be used as part of the assessments of the probability of significant changes on local fracture permeabilities and local effective porosities (Study 8.3.1.8.3.3) and local distribution coefficients (Study 8.3.1.8.4.1).

8.3.1.8.5.2.1 Activity: Evaluation of depth of curie temperature isotherm

Objectives

The objective of this activity was intentionally omitted. The most current evaluation of curie temperature data shows that the technique yields results that are too ambiguous and are at a scale of detection too general to be useful for application at Yucca Mountain.

8.3.1.8.5.2.2 Activity: Chemical and physical changes around dikes

Objectives

The objective of this activity was intentionally omitted. Data on the nature and extent of physical changes that may occur in the surrounding tuffs as a result of the intrusion of dikes or sills will be collected under Study 8.3.1.8.1.2.

8.3.1.8.5.2.3 Activity: Heat flow at Yucca Mountain and evaluation of regional ambient heat flow anomalies

Objectives

The objectives of this activity are to

1. Compile and evaluate available heat flow data at and near Yucca Mountain.
2. Assess the need for additional heat flow determinations.
3. Collect additional thermal data from existing and planned drill holes.
4. Identify and evaluate thermal anomalies.

8.3.1.8.5.3 Study: Investigation of folds in Miocene and younger rocks of region

The objective of this study is to establish the regional pattern and rate of Neogene folding. The parameters TBD are distribution, amplitude, and age of folds.

8.3.1.8.5.3.1 Activity: Evaluation of folds in Neogene rocks of the region

Objectives

The objective of this activity is to establish the pattern, rate, amplitude, and wavelength of post-middle-Miocene folding in the region.

8.3.1.9 The human interference program

Summary of performance and design requirements for human interference information

The postclosure human interference test program addresses 1) the likelihood of inadvertent human intrusion into a mined geologic disposal system (MGDS), 2) interference with long-term MGDS performance due to human activities, and 3) the possible consequences of such interference events.

8.3.1.17.2.1.1 Activity: Assess the potential for surface faulting at prospective sites of surface facilities important to safety

Objectives

The objective of this activity is to assess the stability of the site surface with respect to fault displacement, at locations proposed for FITS.

8.3.1.17.2.1.2 Activity: Assess the potential for displacement on faults that intersect underground facilities

Objectives

The objective of this activity is to assess the potential for displacement on faults that intersect underground facilities.

8.3.1.17.3 Investigation: Studies to provide required information on vibratory ground motion that could affect repository design or performance

Purpose and objectives of the investigation

The purposes of this investigation are to 1) develop a seismic-design basis for repository facilities that are ITS and 2) provide other information that will facilitate the assessment of the adequacy of the seismic-design basis and the identification of credible accidents that might be initiated by seismic events and lead to release of radioactive materials. The seismic-design basis will account for both the potential occurrence of earthquakes on nearby faults and potential future underground nuclear explosions (UNEs) at the NTS.

8.3.1.17.3.1 Study: Relevant earthquake sources

The objectives of this study are to identify and characterize those earthquake sources that are relevant to seismic hazard analysis of the site; i.e., those sources that could cause significant surface fault displacement or ground shaking at the site.

8.3.1.17.3.1.1 Activity: Identify relevant earthquake sources**Objectives**

| The objective of this activity is to identify earthquake sources that could generate significant surface fault displacements or severe ground motions at the site.

8.3.1.17.3.1.2 Activity: Characterize relevant earthquake sources**Objectives**

| The objective of this activity is to characterize each relevant earthquake source identified in the previous activity with a spatial description (including an expected depth or depth range), an assessment of activity, evaluations of maximum earthquake magnitude, the size and location of expected coseismic displacements (for sources in or near the controlled area), and the recurrence rate for earthquakes associated with the source. The source characterization includes an evaluation of variability in and dependency of input parameters.

8.3.1.17.3.2 Study: Underground nuclear explosion sources

The objective of this study is to characterize the potential future UNEs at the NTS that region would result in the most severe motions at the repository site.

8.3.1.17.3.2.1 Activity: Determine the range of underground nuclear explosion sources**Objectives**

The objective of this activity is to determine potential locations and upper limits on the yield of future UNE tests within the NTS.

8.3.1.17.3.2.2 Activity: Determine maximum underground nuclear explosion source(s)**Objectives**

The objective of this activity is to identify the potential future UNE(s) that would generate the most severe ground motions at the site.

Study: Engineered barrier system field tests

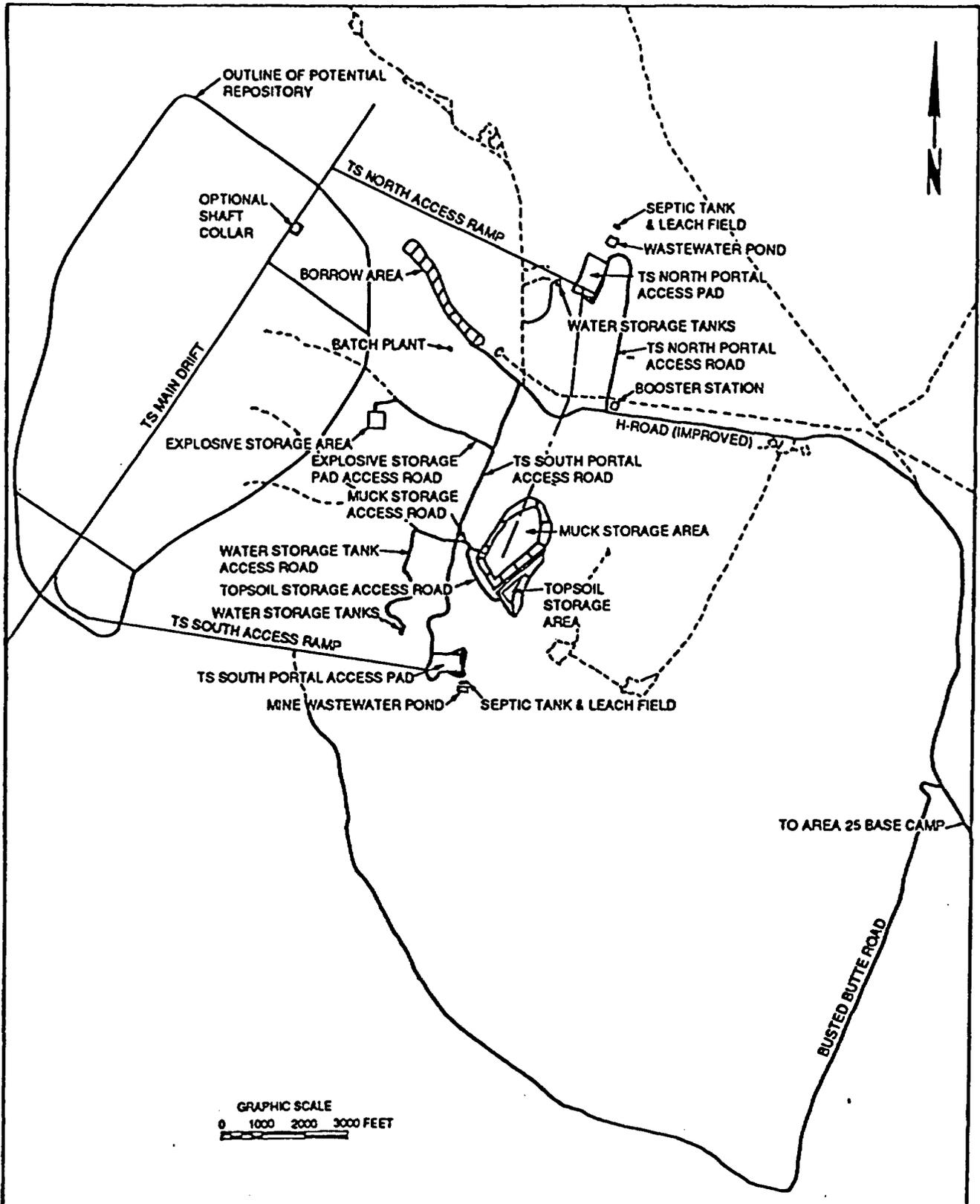
Purpose and operations

The EBS field tests will determine the in situ hydrologic transport properties in rock at the repository horizon and determine the effect on water chemistry of near-field thermal perturbation. These waste package environment tests will provide thermal, hydrologic, mechanical, and limited chemical alteration information during an abbreviated thermal cycle (of at least 1 year duration) in the very near-field emplacement environment. In test alcoves in the dedicated test area, horizontal and vertical heater emplacement holes and small-diameter parallel and perpendicular instrumentation holes will be drilled. Heater canisters and associated instrumentation packages will be inserted to monitor thermal, moisture, and stress and strain parameters during a thermal cycle (heating and subsequent cooling) in each test. In selected tests, water will be injected during heating and cooling stages while monitoring takes place. Core from the rock mass adjacent to the heater hole will be recovered and petrologic, petrographic, mineralogic, and related laboratory analyses will be performed to identify thermally induced alterations.

Constraints and zones of influence

Isolation from mining operations and mine traffic is an essential constraint for this set of experiments. Isolation from mining is required to ensure that the stress state near the heater boreholes is not influenced by excavation of other drifts once the test has begun. Also, the experiment drifts for this area cannot tolerate significant drying of the rock mass or temperature changes from sources other than the experiment heaters. A 40 ft (12 m) standoff around the heater holes is required to allow for monitoring of condensation from the heaters. Some flexibility of orientation of the experiment drifts is desired to ensure that fracture or joint sets are not parallel to the axis of the horizontal boreholes. Recent evaluations have indicated that drift separation of approximately 75 ft may be needed to ensure isolation of the individual tests.

At 24 months, the zone of thermally disturbed rock around either vertical or horizontal heater holes is calculated to extend approximately 10 m (33 ft) radially from the heater centerline (based on the expectation of 6 months of heating at maximum power, 6 months of rampdown from the maximum power level to zero, and 12 months with no heat (Buscheck and Nitao, 1988)). Within the thermally altered zone, the 100°C isotherm will be a maximum of approximately 2 m radially from the centerline of the heater. Water within this isotherm is expected to be vaporized and to condense near the 100°C isotherm boundary. Hence, a zone of saturation may occur in this region. The water contained in this region is expected to be imbibed into the matrix in a zone that may extend to a maximum of about 10 m beyond the 100°C isotherm (Martinez, 1988). Thus, a hydrologically altered region that may extend to a maximum of 12 m from the heater is created. Because of the small volume of rock dehydrated, the hydrologically altered zone is likely to be less than the estimated 12 m maximum. Thermochemical alteration of the tuff may occur within the hydrologically altered region (Delany, 1985). Therefore, the zones of potential chemical and hydrological alteration are approximately coincident with the zone of thermal alteration. Thermally induced stresses are also expected within the thermal zone. In the rock mass beyond the maximum extent of the thermal zone, stresses should not be more than 10 percent above the initial in situ stress (Butkovich and Yow, 1986). The stressaltered region, due to mining of the test rooms, will extend two drift diameters from the outer drifts. The thermal, chemical, and hydrologic zones of influence are anticipated to be contained well within the mechanical zone resulting from drift construction.



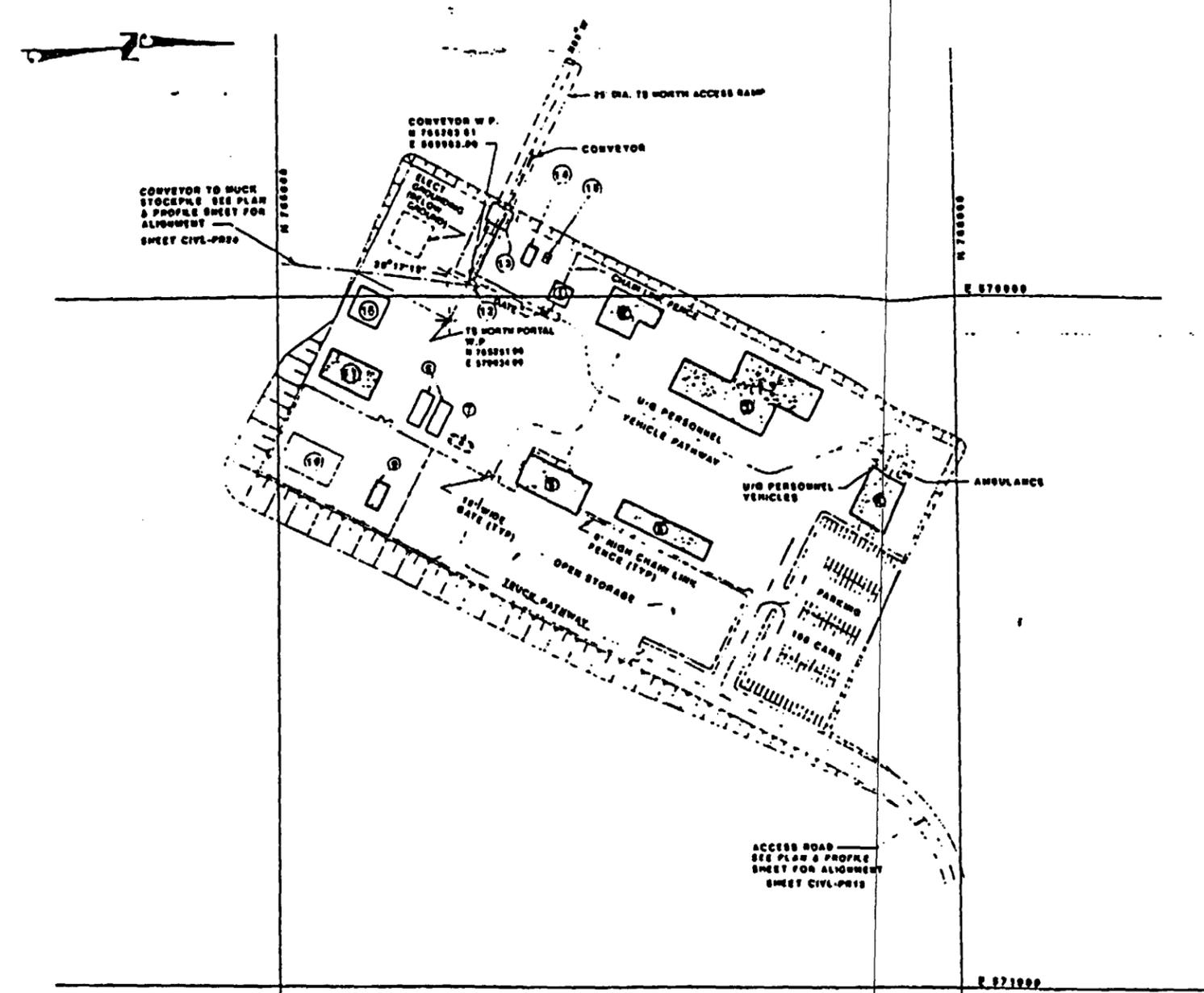
| Figure 8.4.2-14. Exploratory Studies Facility Overall Site Plan (Modified from DOE 1992, Drawing No. YMP-025-1-CIVL-PL01, Rev. 0)

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LEGEND

- ① PORTAL CONTROL CENTER BUILDING
- ② SURFACE DATA BUILDING
- ③ TEST SUPPORT BUILDING
- ④ CHANGEHOUSE BUILDING
- ⑤ SHOP/WAREHOUSE BUILDING
- ⑥ MAIN WAREHOUSE BUILDING
- ⑦ UNDERGROUND FUEL STORAGE
- ⑧ GENERATORS PADS
- ⑨ ELECTRICAL SUB-STATION CONTROL BUILDING
- ⑩ TRANSFORMER PAD
- ⑪ ELECTRICAL SWITCHGEAR BUILDING
- ⑫ CONVEYOR TRANSFER TOWER
- ⑬ NORTH PORTAL
- ⑭ MICROWAVE COMMUNICATION BLDG.
- ⑮ MICROWAVE COMMUNICATION TOWER
- ⑯ AIR COMPRESSOR PAD

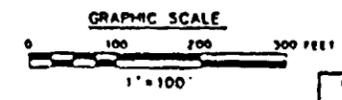


**ANSTEC
APERTURE
CARD**

Also Available on
Aperture Card

FOR REFERENCE DRAWINGS INDEX SEE DRAWING YMP-025-1-CIVL-002

PLAN
SCALE: 1"=100'



9409060211-01

NO	DATE	REVISION	DES	CHK	CHK	DEC	CHK	ENV	SAP	QA	TRG	TRPO
U.S. DEPARTMENT OF ENERGY YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT OFFICE LAS VEGAS, NEVADA												
APPROVALS		RSN Raytheon Services Nevada LAS VEGAS, NEVADA										
DESIGN	ILL	EXPLORATORY STUDIES FACILITY TS NORTH PORTAL GENERAL ARRANGEMENT SURFACE SITE PLAN										
NAME	DOB	SUBMITTED BY: [Signature] DATE: [Date] DRAWING NO: YMP-025-1-CIVL-PL02 REV: 0										
CHGNO	CHK	PER: [Signature]										
CHK	CHK	128311										

Figure 8.4.2-15. Exploratory Studies Facility TS North Portal General Arrangement Surface Site Plan

8.4.2-80

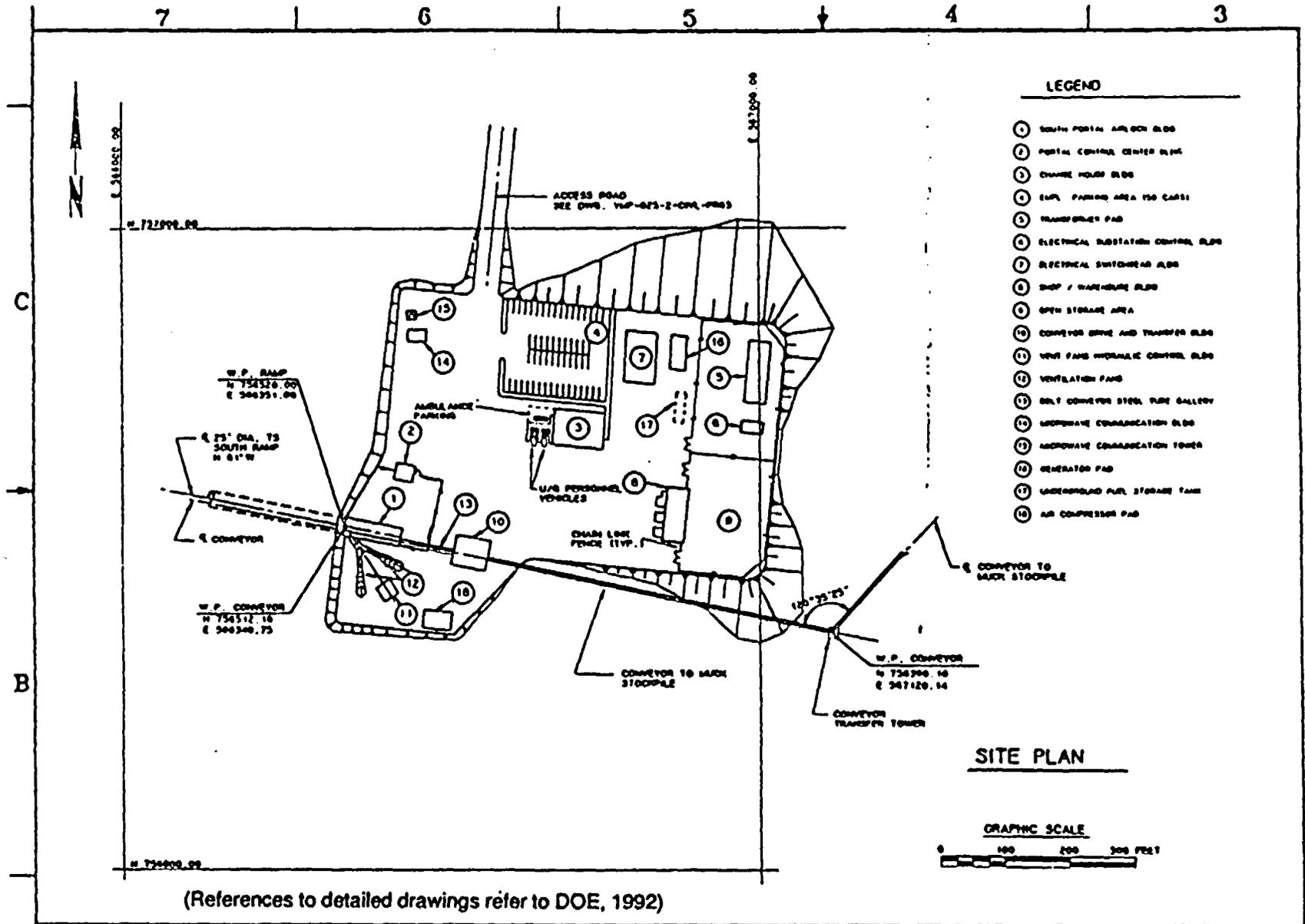


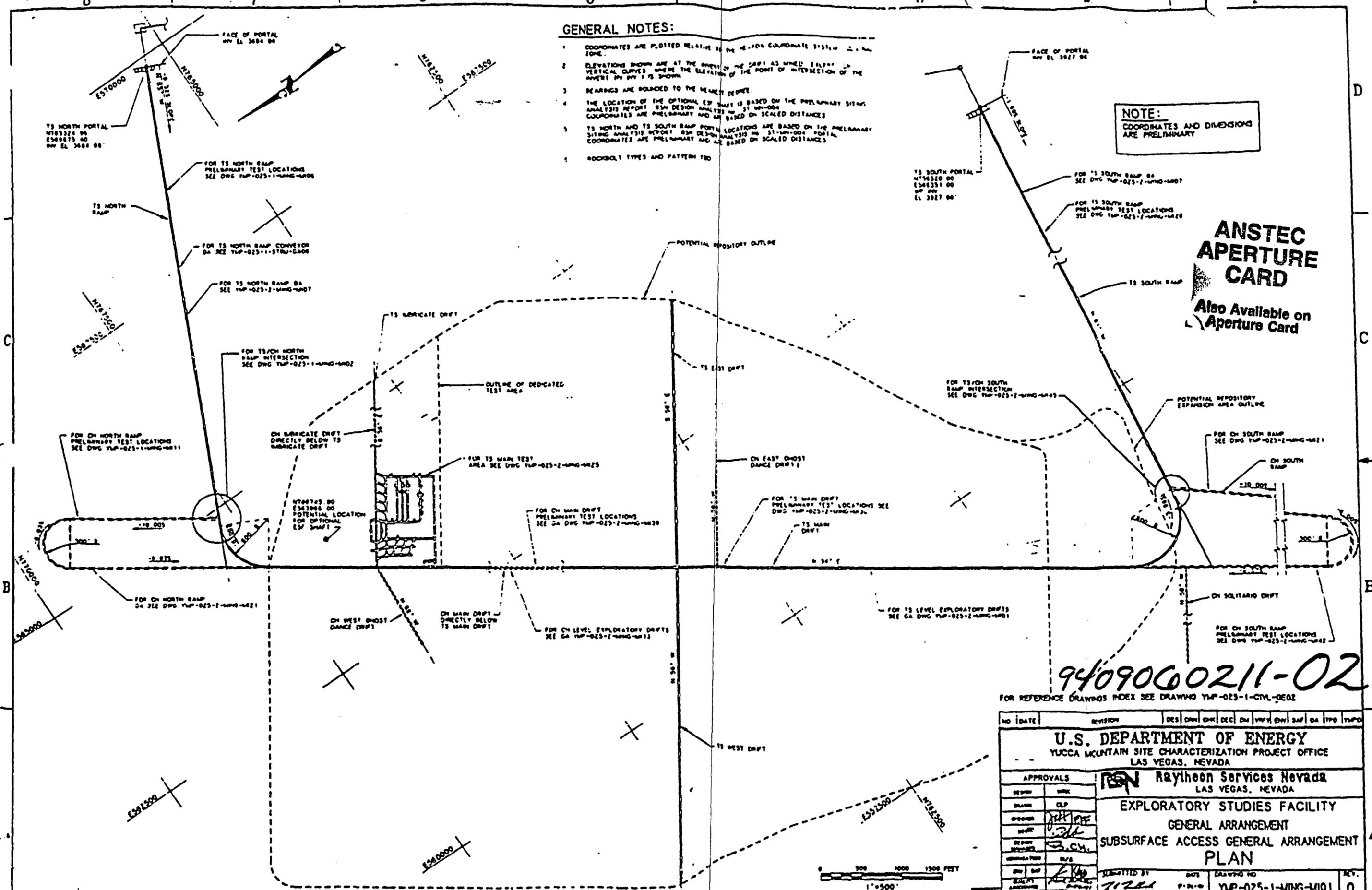
Figure 8.4.2-16. South Portal Surface Site Plan. (Modified from DOE, 1992; Drawing No. YMP-025-2-CIVL-PL01)

GENERAL NOTES:

- COORDINATES ARE PLOTTED RELATIVE TO THE U.S. COORDINATE SYSTEM 2.0 METER TONE.
- ELEVATIONS SHOWN ARE AT THE POINT OF THE CAPRI AS UNED 1:5000 VERTICAL CURVES WHERE THE ELEVATION OF THE POINT OF INTERSECTION OF THE INVERT BY PVI IS SHOWN.
- BEARINGS ARE RELATED TO THE NEAREST DEGREE.
- THE LOCATION OF THE OPTIONAL ES/ SHAFT IS BASED ON THE PRELIMINARY SITING ANALYSIS REPORT 85M DESIGN ANALYSIS NO. 51 UN-004. COORDINATES ARE PRELIMINARY AND ARE BASED ON SCALED DISTANCES.
- TS NORTH AND TS SOUTH RAMP PORTAL LOCATIONS ARE BASED ON THE PRELIMINARY SITING ANALYSIS REPORT 85M DESIGN ANALYSIS NO. 51 UN-004. PORTAL COORDINATES ARE PRELIMINARY AND ARE BASED ON SCALED DISTANCES.
- ROCKBOLT TYPES AND PATTERN TBD.

NOTE:
COORDINATES AND DIMENSIONS ARE PRELIMINARY

ANSTEC APERTURE CARD
Also Available on Aperture Card



SUBSURFACE ACCESS GENERAL ARRANGEMENT PLAN

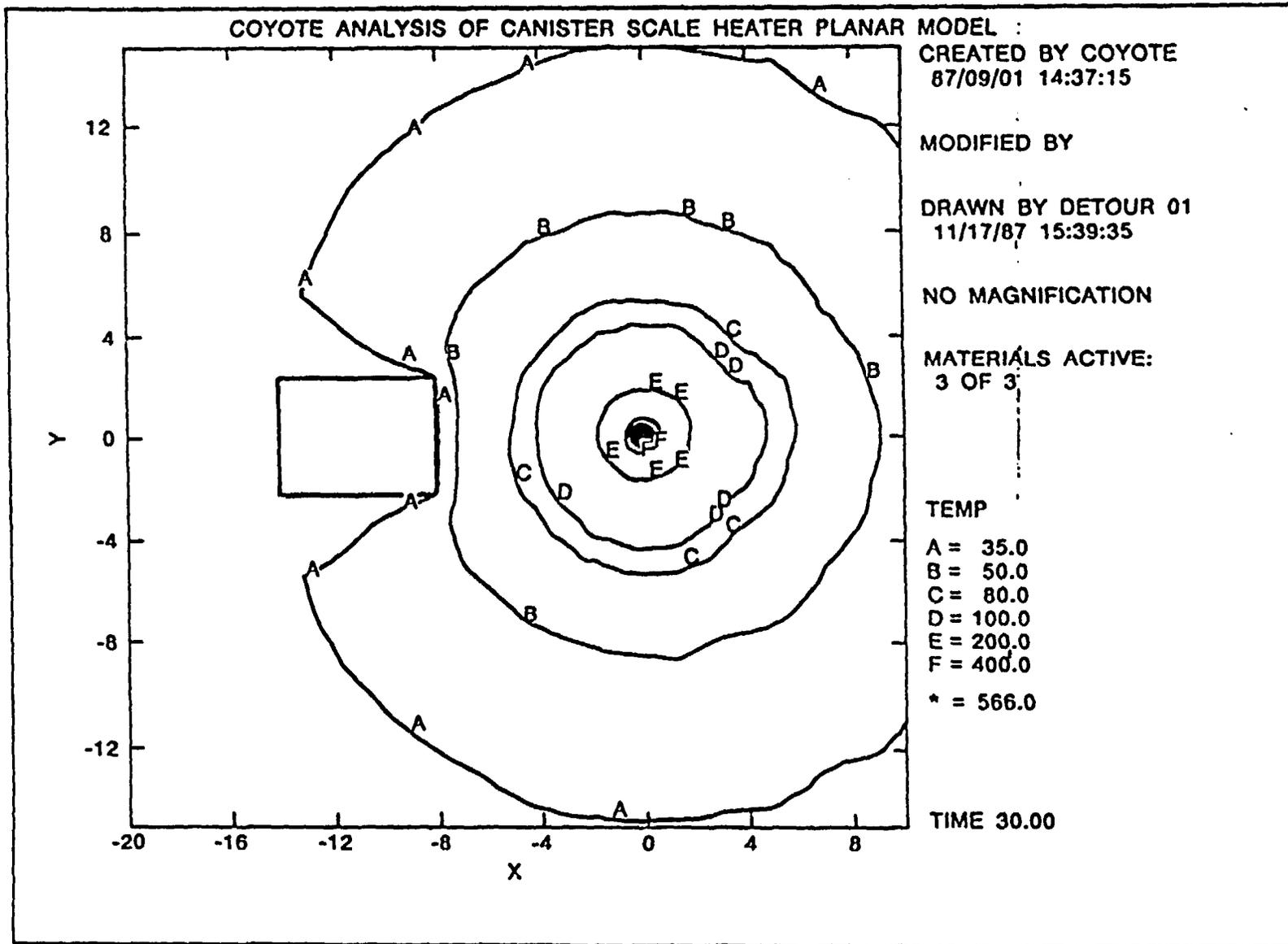
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FOR REFERENCE DRAWINGS INDEX SEE DRAWING YMP-025-1-CYL-0002

NO	DATE	REVISION	DES	DRW	CHK	DEC	ENR	APP	BY	SAF	QA	TRD	TRPO											
<p align="center">U.S. DEPARTMENT OF ENERGY YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT OFFICE LAS VEGAS, NEVADA</p>																								
<p align="center">APPROVALS</p> <table border="1"> <tr> <td>DESIGN</td> <td>WPC</td> <td rowspan="5"> </td> </tr> <tr> <td>DRWING</td> <td>CLP</td> </tr> <tr> <td>ENGINEER</td> <td>[Signature]</td> </tr> <tr> <td>INSPECTOR</td> <td>[Signature]</td> </tr> <tr> <td>CONTRACTOR</td> <td>[Signature]</td> </tr> </table> <p align="center">Raytheon Services Nevada LAS VEGAS, NEVADA</p> <p align="center">EXPLORATORY STUDIES FACILITY GENERAL ARRANGEMENT SUBSURFACE ACCESS GENERAL ARRANGEMENT PLAN</p>														DESIGN	WPC		DRWING	CLP	ENGINEER	[Signature]	INSPECTOR	[Signature]	CONTRACTOR	[Signature]
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Figure 8.4.2-16a. Exploratory Studies Facility Reference Design Concept.

8.4.2-90



PLANAR MODEL TEMPERATURE CONTOURS AT 30 MONTHS

Figure 8.4.2-17. Thermal analysis of canister scale heater test planar model.