



Department of Energy
Washington, DC 20585

SEP 8 1993

Mr. Joseph J. Holonich, Director
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Holonich:

The enclosed Yucca Mountain Site Characterization Project participant monthly status reports are forwarded for your information. If you have any questions on the enclosed reports, please contact Priscilla Bunton at (202) 586-8365.

J. P. Roberts
Linda J. Desell, Chief *for*
Regulatory Integration Branch
Office of Civilian Radioactive
Waste Management

Enclosures: *in the shelf*

- (1) EG&G/EM Remote Sensing Laboratory Progress Report, June 1993
- (2) Los Alamos Monthly Activity Report Highlights, May 1993
- (3) Los Alamos Monthly Activity Report Highlights, June 1993
- (4) Los Alamos Monthly Activity Report, May 1993
- (5) REECo Yucca Mountain Project Status Report, July 1993
- (6) Sandia National Laboratories Monthly Highlights and Status Report, June 1993
- (7) USGS Detailed Monthly Status Report, May 1993

15-023

*102.8
WM-11
NH03*

cc:(w/out encl.)

C. Gertz, YMPO

(w/encl.)

Alice Cortinas, CNWRA

Ken Hooks, NRC

T. J. Hickey, Nevada Legislative Committee

R. Loux, State of Nevada

D. Bechtel, Las Vegas, NV

Eureka County, NV

Lander County, Battle Mountain, NV

P. Niedzielski-Eichner, Nye County, NV

W. Offutt, Nye County, NV

L. Bradshaw, Nye County, NV

C. Schank, Churchill County, NV

F. Mariani, White Pine County, NV

V. Poe, Mineral County, NV

J. Pitts, Lincoln County, NV

J. Hayes, Esmeralda County, NV

B. Mettam, Inyo County, CA

EG&G ENERGY MEASUREMENTS

Las Vegas Area Operations

EG&G ENERGY MEASUREMENTS, INC., P.O. BOX 1912, LAS VEGAS, NEVADA 89125

WBS 1.2.5.3.6

QA: NA

JUL 23 2 18 PM '93

I-344831

July 23, 1993
NV-93-583

Mr. Carl P. Gertz, Project Manager
Department of Energy
Yucca Mountain Site Characterization Project Office
101 Convention Center Drive
Las Vegas, NV 89109

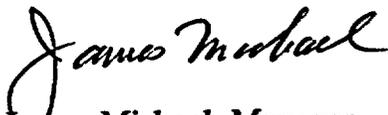
**JUNE 1 - JUNE 30, 1993 PROGRESS REPORT - EG&G/ENERGY
MEASUREMENTS REMOTE SENSING LABORATORY SUPPORT TO THE
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT**

Enclosed is a progress report on the EG&G Energy Measurements (EG&G/EM) Remote Sensing Laboratory (RSL) support to the Yucca Mountain Site Characterization Project (YMP) for June 1, 1993, through June 30, 1993.

The progress report for EG&G/EM RSL support to YMP includes the following sections:

- o Work Accomplished
- o Expenditures
- o Status of Deliverables

If you have any questions, please contact Elaine Ezra at (702) 794-7449.



James Michael, Manager
NV Program

CE:ns

Enclosures

RP752
7-25-93

ENCLOSURE 1

Carl P. Gertz

**JUNE 1 - JUNE 30, 1993 PROGRESS REPORT - EG&G/ENERGY
MEASUREMENTS REMOTE SENSING LABORATORY SUPPORT TO THE
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT**

July 23, 1993

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cc: S. Ronshaugen, DOE/NV EMD (w/o encl)
M. Blanchard, DOE/YMP (w/o encl)
S. Bodnar, M&O (w/o encl)
W. Dixon, DOE/YMP (w/o encl)
M. Dockter, DOE/NV (w/o encl)
R. Dyer, DOE/NV (w/o encl)
J. Lorenz, REECo/YMP
C. Newbury, DOE/YMP
A. Robison, DOE/YMP (w/o encl)
M. Ryder, DOE/YMP (w/o encl)
A. Simmons, DOE/YMP
D. Williams, DOE/YMP (w/o encl)
W. Wilson, DOE/YMP

*rec'd with letter
dated 9/8/93*

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.3 SITE INVESTIGATIONS

WBS 1.2.3.1 SITE INVESTIGATIONS COORDINATION AND PLANNING

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: D.W. Brickey

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Dave Brickey met with Mark Tynan (YMPO) on June 2 to discuss the 3-D modeling capabilities maintained for YMPO by EG&G/EM. Also discussed were the other models under development on the YMP, and how the Dynamic Graphics system will or will not be able to interact.
2. Dave Brickey demonstrated the Dynamic Graphics EarthVision software to Robert Elayer (M&O) on June 4.
3. A meeting was held with Steve Bodnar, Hilary Abhold, and Kelly Coyle (M&O/TRW), and Dave Brickey and Elaine Ezra on June 9 to discuss the use of Dynamic Graphics to prepare a "snapshot" of the Yucca Mountain site using the best available information. Data availability and how Kelly might be able to construct the models was discussed.
4. A meeting was held with Mark Tynan (YMPO), John Gauthier (M&O/WCFS) and Dave Brickey and Elaine Ezra on June 10 to discuss resource requirements for the 3-D modeling efforts.
5. Dave Brickey met with Hilary Abhold and Kelly Coyle on June 11 to discuss an approach for their planned modeling effort and the types of products that could be prepared.
6. Dave Brickey met with Kelly Coyle on June 17 to discuss the extent of available data, particularly the Sample Management Facilities preliminary drillhole data.
7. A meeting was held with John Gauthier (M&O/WCFS) and Dave Brickey and Elaine Ezra on June 25 to discuss FY93 deliverables for the 3-D modeling effort. Two primary areas of interest were discussed; 1) Lynx will be installed on the

YMPSO system with the USGS model, and 2) a preliminary stratigraphic model using the Dynamic Graphics (DGI) system will be generated. Input to the DGI model will include data derived from the USGS cross-sections generated on the Lynx system.

The goal for FY94 is to initiate the creation of an integrated 3-D model of the site using models created by the responsible participant organizations.

8. NOTE: EarthVision 1.2 is scheduled for release by the end of July 1993 and will allow the direct import of ARC/INFO coverages and the ability to drape raster data (images) onto the interactive 3-D models.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. The NRC has requested an informal site visit with the YMPO to discuss 3-D modeling. The visit is anticipated during July or August.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

WBS 1.2.5.3.5 TECHNICAL DATABASE INPUT

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: C.E. Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD: None.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

- 1. Funding for this task element was reallocated to another participant. No progress is expected this fiscal year.**

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

**WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND
EVALUATION SYSTEM (GENISES)**

SA OE536A GENISES TECHNICAL DATABASE

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: J. Beckett

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. **Jim Beckett and Chris Berlien met with Roger Eckhardt, the Database Administrator from Los Alamos National Laboratories, on June 2 to discuss formats for TDB submittals.**
2. **Elaine Ezra met with Jim Hall (LANL) on the Tracers, Fluids and Materials (TFM) database on June 2 to discuss the type of data from the TFM database that would be transferred to the TDB.**
3. **Dave Eley (SNL) visited Jim Beckett and Dave Brickey on June 3 to discuss the TDB and Dynamic Graphics 3-D modeling system.**
4. **Elaine Ezra, Jim Beckett and Chris Berlien attended the Technical Database Working Group meeting on June 3. Jim Beckett presented options for improving the response time for making entries to the ATDT for the USGS remote locations. Elaine Ezra presented the planned GIS catalog product. An example entry was prepared and will be provided to participants for review and comment.**
5. **Elaine Ezra met with Mark Fortsch (M&O) on June 8 to discuss what radiation survey data has been collected for the Yucca Mountain site by EG&G/EM. A listing of published reports, a copy of two EG&G/EM reports, and a listing of planned reports and surveys were provided to Fortsch.**
6. **Howard Oliver (USGS) visited YMP SO on June 10 to review available digital elevation model (DEM) and elevation contour data for Yucca Mountain. Oliver**

is interested in the orthophoto-based DEM for his work on detailed gravity at Yucca Mountain.

7. Elaine Ezra met with Greg Fasano (SAIC) and Dick LaCamera (USGS) on June 14 to discuss data transfer formats to and from the YMP GIS database.
8. Dave Brickey and Chris Berlien met with Russ Hilsinger, Rod Drake and Randolph Schreiner (RSN), and Ron Oliver, Ned Elkins and Chris Breeds (LANL), on June 22 to discuss a database for surface water use and the types of map products that can be generated. The surface water usage will be submitted quarterly to the YMP TDB and a map product to reflect the data will be prepared on a quarterly basis.
9. A meeting was held on June 30 with Ardyth Simmons and Tim Sullivan (YMPO), Steve Smith and Charlie Schlinger (SAIC) and Elaine Ezra to discuss the test planning process. SAIC was tasked to provide the status of planned activities to EG&G/EM as the data are available. These data would minimally include: activity identifier, activity type, location, source, and planned start date. A format for the data input will be developed by SAIC and EG&G/EM and provided to YMPO for approval. The data furnished by SAIC would provide "preliminary" locations of planned activities. The authenticated location of test activities will come from the RSN as-built survey reports.
10. Due to staffing shortages, a purchase request for digitizing services to scan digitize the 1990 YMP black-and-white orthophotos and to digitize the surface disturbance features mapped from the 1:12,000 scale orthophotos was initiated.
11. A request for digital GIS data was made to Tim Liebermann (USGS-WRD/Carson City) on June 28 for 1:100,000 scale DEM data for the NTS area; 1:250,000 scale DEM for the state of Nevada; and any other geohydrology plates they have automated that may be useful to the YMP.
12. No submittals to the GENISES Technical Database were received.
13. The following submittals to the GENISES Technical Database were processed into the GENISES TDB:
 - SAND87-2380 - Statistical Analysis of Hydrologic Data for Yucca Mountain (SNSAND87238000.000) was completed on June 2, 1993.
 - SAND85-0703 - Uniaxial and Triaxial Compression Test Series on the Topopah Spring Member for USW G-2, Yucca Mountain, Nevada (SNSAND85070300.000) was completed on June 2, 1993.

- LA000000000011.001 - Cation Ratio Data for Boulder Deposits on Yucca Mountain Area Hillslopes was completed on June 14, 1993.
- LA000000000026.002 - Rock-Varnish Cation Ratio Data and Rock-Varnish Dating Curve Calibration Sites was completed on June 15, 1993.
- LA000000000036.001 - Calcite-Silica Deposits in Trench 14 and Busted Butte was completed on June 16, 1993.
- LA000000000014.002 - Calcite Deposits in Drill Cores USW G-2 and USW GU-3/G-3 at Yucca Mountain, Nevada was completed on June 17, 1993.
- SAND84-1101 - Uniaxial and Triaxial Compression Test Series on the Topopah Spring Tuff from USW G-4, Yucca Mountain, Nevada (SNSAND84110100.000) was completed on June 23, 1993.
- SAND85-0762 - Bulk, Thermal, and Mechanical Properties of the Topopah Spring Member of the Paintbrush Tuff, Yucca Mountain, Nevada (SNSAND85076200.000) was completed on June 28, 1993.

14. No backlogged submittals to the SEPDB were processed administratively into the GENISES Technical Database.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. GENISES staff will prepare input for the Quarterly Report.
2. A meeting to develop the format for planned activities will be scheduled.
3. A letter identifying drillhole designator discrepancies and a recommended approach for assigning designators and collecting coordinates for locations of planned activities will be completed.
4. ArcView thematic datasets will be prepared and distributed to project ArcView users.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

**WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND
EVALUATION SYSTEM (GENISES)**

SA OE536B SITE ATLAS

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: B. Kistler

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Drafts of all of the FY93 Site Atlas text pages have been completed.
2. Site Atlas coverage development has been nearly completed.
3. Continued data collection and map preparation.
4. The digital version of the Scott and Bonk geology map received from USGS is requiring a significant effort to process into a usable product. The map was digitized with no topology or coding. Therefore, not a single arc is intersected or connected. There are thousands of edits and corrections to be made (over and undershoots, add intersections, code faults and contacts, interpret hanging contacts, add missing arcs, etc.)
5. The Stewart and Carlson Geology map of Nevada received from USGS also required significant processing. The digital data was received as two coverages (northern and southern Nevada). The boundary between north and south apparently had not been edge-matched, and required two weeks of careful review and editing. Several attribute coding errors were discovered and corrected. The documentation for this coverage was poor. This map has been corrected and can now be included in the FY93 Site Atlas.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. A draft of the FY93 Site Atlas will be completed.
2. Sections of the Site Atlas will be provided to appropriate YMP participants for review.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

**WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND
EVALUATION SYSTEM (GENISES)**

SA OE536C GIS, MAPPING AND ANALYSIS

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: C.E. Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. **GIS map products were generated to support project participants and are detailed in the "Deliverables" statement.**

2. **Other "non-map" products include the following:**
 - **Two color viewgraphs of YMP-93-020.1 were provided to Allison Inglett (SAIC) on June 9.**

 - **One 8mm cartridge tape containing nine ARC/INFO "UNGENERATE" data files and one description file was provided to Hal Rager (DRI) on June 9 of the following features:
 Surface disturbances; existing and planned boreholes, pits and trenches; transportation; topography and annotation for 1:12,000 scale sheet 11.**

 - **Three blackline sets of the 1:6,000 and 1:12,000 scale orthophotographs were provided to Howard Oliver (USGS) on June 13.**

 - **One blackline copy of the 1:6,000 scale orthophotos (sheets 1-4 and 6-30) was provided to Charles Harrington (LANL) on June 15.**

 - **One contact color print each of Perf #7242 frames 72-74 and 112-114 was provided to Charles Harrington (LANL) on June 15.**

- One copy of the USGS Borehole Cross-Sections (DTN: GS930308314221.009) was provided to Sue Braumiller (M&O/INTERA) on June 15.
- Two 48" x 72" color Duraflex prints of EG&G Negative #6677-20 were provided to Jerry Lorenz (REECO/YMPO) on June 15.
- One copy of a listing of remote sensing and GIS data held in the YMP database was provided to John Petterson (via Dennis Bechtel, Clark County) on June 18.
- One contact color print of each of the following was provided to Chris Fridrich (USGS) on June 23:

<u>Perf #</u>	<u>Frames</u>
6773	9296-9301
6773	9226-9231
6771	8784-8786

- A TAR tape with the following ARC/INFO export files was provided to Richard J. LaCamera (USGS) on June 28:
Administrative boundaries; stream channels; urban centers and spring discharge wells.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: Significant changes to the existing and planned activities ARC/INFO coverages have been made as a result of the update to the FY93 Site Atlas. A preliminary coverage for planned activities that contained errors were used on two products that were delivered. Corrected versions of the maps were generated and delivered. As a result of this problem, a more stringent review process for map products has been implemented. Also, a requestor review form is being developed that will accompany each product to allow the requestor to make comments and suggestions on the products.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. Continued level-of-effort.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

**WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND
EVALUATION SYSTEM (GENISES)**

SA OE536D REMOTE SENSING

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: C.E. Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

- 1. A listing of EG&G/EM radiological survey reports that have been published for the Nevada Test Site was prepared and provided to Jeff Tappen (SAIC). Also provided was a list of surveys that have been completed but not yet published, as well as planned radiological surveys for the Nevada Test Site.**
- 2. A funding transfer from LANL to EG&G/EM and RSN was initiated.**
- 3. Planning for the RSN ground control survey and EG&G/EM photo mission was initiated and work scheduled.**
- 4. Procurement documentation for the orthophoto processing subcontract was compiled.**

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

- 1. Results from the remote sensing survey will be compiled.**
- 2. The ground control field panel layout will be completed and survey initiated.**
- 3. Aerial photography for the orthophoto mission will be acquired.**
- 4. The orthophoto subcontract will be initiated.**

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

**WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND
EVALUATION SYSTEM (GENISES)**

SA OE536E COMPUTER SUPPORT

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: C.W. Logan

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

- 1. The Compliance Evaluation Plan review comments were completed and provided to DOE/YMP IRM.**
- 2. Network schematic drawings for the YMPSO facility were completed.**
- 3. The third X-terminal that had been ordered was received and installed at the YMPSO facility.**
- 4. INGRES Windows/4GL (3-8 node license) was ordered for the YMPSO facility.**

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

**WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND
EVALUATION SYSTEM (GENISES)**

SA OE536F CAPITAL EQUIPMENT

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: C.W. Logan

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

- 1. Bill Smith from Silicon Graphics visited YMPSO on June 9.**
- 2. Mike Milliken from Rastergraphics, an electrostatic plotter, visited the YMPSO on June 10.**
- 3. Brian Borysewich, Scot Siegel and David Coburn from SUN Microsystems visited the YMPSO on June 17 to discuss file server systems and options.**
- 4. Brett Thomas from Synergy visited YMPSO on June 30 to discuss their electrostatic plotter.**

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD: None.

PROGRESS REPORT FOR EG&G/EM RSL SUPPORT TO YMP
Work Accomplished

WBS 1.2.5 REGULATORY

**WBS 1.2.5.3.6 GEOGRAPHIC NODAL INFORMATION STUDY AND
EVALUATION SYSTEM (GENISES)**

SA OE536G PROJECT MANAGEMENT

REPORT PERIOD: June 1, 1993 - June 30, 1993

REPORT DATE: July 23, 1993

RESPONSIBLE INDIVIDUAL: C.E. Ezra

SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:

1. Reporting/Tracking/Planning

- EG&G/EM RSL May Progress report was compiled and submitted to DOE/YMPO.
- May PACS input was compiled and submitted to John Slocum (M&O).

2. Meetings/Conferences/Training:

- Technical Data Managers staff meetings were held with Ardyth Simmons (YMPO), Steve Bodnar and Bob Lewis (M&O) and Elaine Ezra and Jim Beckett on June 1, June 7, June 15, and June 28.
- Jerry Sommerfeld attended YMP Orientation training on June 9.

3. Employee Actions:

- Interviews for the Scientist II positions will continue for qualified external applicants.

4. Records Management:

- Joanna Wiggins met with the YMP Local Records Center to discuss records management requirements and records transmittal procedures.

- Joanna Wiggins attended the DOE Records Management Conference in Seattle, Washington, during the week of June 14-17.
- Joanna Wiggins met with the EG&G/EM Environmental Sciences Department on June 24 to discuss their YMP Records Management needs.

5. **Quality Assurance:**

- EG&G/EM RSL technical procedures are under review to identify possible improvements and efficiencies.
- A meeting was held on June 3 with Elaine Ezra, Joanna Wiggins, Debbie Mogar and Eddie Godfrey to discuss possible impacts of the proposed Technical Directive for EG&G/EM to work under the OCRWM Quality Assurance program.
- A meeting was held on June 28 with EG&G/EM management to discuss the Technical Directive for EG&G/EM to work under the OCRWM Quality Assurance program.
- A meeting was held with Elaine Ezra, Joanna Wiggins, Hall Cristman, Debbie Mogar and Eddie Godfrey on June 29 to develop an approach to implement the QA Technical Directive, and still meet the requirements of the EG&G/EM QA program.

MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.

ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:

1. David Walrath will attend the YMP Orientation.
2. Chris Berlien will attend INGRES report writing training.
3. An approach for meeting the requirements of the QA Technical Directive will be developed.

**Expenditures from June 1, 1993 to June 27, 1993
(Dollars in thousands)**

<u>Task</u>	<u>Budget</u>	<u>June Cost</u>	<u>Total Costs To Date</u>	<u>Remaining</u>
WBS 1.2.3 Site Investigations	\$ 50.0	\$ 0.6	\$ 7.6	\$ 42.4
WBS 1.2.5 Regulatory	\$2,320.0	\$177.6	\$1,276.2	\$ 1,043.8
WBS 1.2.11 QA Support	\$ 140.0	\$ 0.0	\$ 0.0	\$ 140.0
WBS 1.2.15 Support Services	<u>\$ 203.0</u>	<u>\$ 8.9</u>	<u>\$ 95.5</u>	<u>\$ 107.5</u>
TOTALS	\$2,713.0	\$187.1	\$1,379.3	\$1,333.7

STATUS OF DELIVERABLES FOR EG&G/EM RSL SUPPORT TO YMP
June 1, 1993 through June 30, 1993

GIS MAP SUPPORT

<u>Description</u>	<u>Requested by/ Organization</u>	<u>Date Sent</u>	<u>Size</u>	<u>No. of Copies</u>
YMP-93-173.1 YMP, SD Boreholes	Biggar/M&O	6/1/93	Page	2
YMP-93-026.0 Historical Seismic Activity	Agnew/M&O	6/2/93	Full	1
YMP-93-106.0 YM Area with Emergency Response Grid	White/YMPO	6/2/93	Page	50
YMP-93-106.0 YM Area with Emergency Response Grid	White/YMPO	6/3/93	Page	50
YMP-91-012.1 Alluvium Faults	Kersch/SAIC	6/3/93	Page	1
YMP-91-014.1 Alluvium	Kersch/SAIC	6/3/93	Page	1
YMP-92-240.0 Location Map 1 and 2, Cross Section Sheet 3 and 4	Hunter/USGS	6/4/93	Full	1
YMP-93-086.0 YMP, Test Interference, Map Sheet 15	Olsen/RSN	6/4/93	Full	3
YMP-91-008.2 YMP Ortho- photo Sheet Index	Oliver/USGS	6/4/93	Full	1
YMP-91-008.2 YMP Ortho- photo Sheet Index	Plouff/USGS	6/4/93	Full	1
YMP-106.0 YM Area with Emergency Response Grid	White/YMPO	6/6/93	Page	50

YMP-93-135.0 Potentially Useable Areas with Surface Hydrography	Hilsinger/RSN	6/7/93	Full	1
YMP-93-132.0 YMP, Reported Activities Completed between 1 October 1992 and 31 March 1993 (Near Field) with topography)	Rixford/M&O	6/7/93	Page	1
YMP-93-133.0 YMP, Reported Activities Completed between 1 October 1992 and 31 March 1993 (Far Field) with topography)	Rixford/M&O	6/7/93	Page	1
YMP-106.0 YM Area with Emergency Response Grid	White/YMPO	6/8/93	Page	50
YMP-106.0 YM Area with Emergency Response Grid	White/YMPO	6/9/93	Page	50
YMP-93-020.1 Report Figures for Erosion Study	Inglett/SAIC	6/9/93	Page	2
YMP-93-070.0 (Disturbances from Orthophotos)	Gabbert/EG&G/EM	6/9/93	Full	2
YMP-93-087.0 Test Interference Map Sheet 16	Gabbert/EG&G/EM	6/9/93	Full	2
YMP-93-086.0 Test Interference Map Sheet 15	Gabbert/EG&G/EM	6/9/93	Full	2
YMP-93-182.0 Potentially Useable Areas and Surface Hydrography	Hilsinger/RSN	6/9/93	Full	4
YMP-93-183.0 Existing Boreholes, Repository Block Area (with/topo)	Einarson/MK	6/9/93	Full	1

YMP-93-183.1 Existing Boreholes, Repository Block Area (without topo)	Einarson/MK	6/9/93	Full	1
YMP-93-082.0 Test Interference Map Sheet 11	Rager/DRI	6/9/93	Full	1
YMP-106.0 YM Area with Emergency Response Grid	White/YMPO	6/10/93	Page	50
YMP-93-181.0 Proposed Boreholes with Depth	Simmons/YMPO	6/10/93	Full	1
YMP-93-177.0 Planned FY94 Boreholes, Workslope Consolidation Meeting - June 1993 (Location Map)	Biggar/M&O	6/11/93	Full	1
YMP-93-178.0 Planned FY94 Boreholes, Workslope Consolidation Meeting - June 1993 (Map-1)	Biggar/M&O	6/11/93	Full	1
YMP-93-179.0 Planned FY94 Boreholes, Workslope Consolidation Meeting - June 1993 (Map-2)	Biggar/M&O	6/11/93	Full	1
YMP-93-106.0 YM Area with Emergency Response Grid	White/YMPO	6/11/93	Page	50
YMP-91-005.1 Roads Approved for Use	Von Seggern/UNR	6/14/93	Full	3
YMP-92-125.0 Potential Hazards Map	Von Seggern/UNR	6/14/93	Full	3
YMP-93-010.0 Area Overview, North	Waller/Duke Power Co.	6/14/93	Full	1

YMP-93-055.0 Existing Boreholes with Proposed Exploratory Studies Facilities	Waller/Duke Power Co.	6/14/93	Full	1
YMP-92-003.3 Regional Water Level and Spring-Discharge Monitoring Sites	Fasano/T&MSS	6/14/93	Full	12
YMP-93-072.0 Test Interference Map Sheet 1	Mrotek/WCFS	6/14/93	Full	1
YMP-93-073.0 Test Interference Map Sheet 2	Mrotek/WCFS	6/14/93	Full	1
YMP-93-074.0 Test Interference Map Sheet 3	Mrotek/WCFS	6/14/93	Full	1
YMP-93-075.0 Test Interference Map Sheet 4	Mrotek/WCFS	6/14/93	Full	1
YMP-93-076.0 Test Interference Map Sheet 5	Mrotek/WCFS	6/14/93	Full	1
YMP-93-077.0 Test Interference Map Sheet 6	Mrotek/WCFS	6/14/93	Full	1
YMP-93-078.0 Test Interference Map Sheet 7	Mrotek/WCFS	6/14/93	Full	1
YMP-93-082.0 Test Interference Map Sheet 11	Mrotek/WCFS	6/14/93	Full	1
YMP-93-084.0 Test Interference Map Sheet 13	Mrotek/WCFS	6/14/93	Full	1
YMP-93-090.0 Test Interference Map Sheet 19	Mrotek/WCFS	6/14/93	Full	1
YMP-93-091.0 Test Interference Map Sheet 20	Mrotek/WCFS	6/14/93	Full	1
YMP-93-093.0 Test Interference Map Sheet 22	Mrotek/WCFS	6/14/93	Full	1

YMP-93-094.0 Test Interference Map Sheet 23	Mrotek/WCFS	6/14/93	Full	1
YMP-93-095.0 Test Interference Map Sheet 24	Mrotek/WCFS	6/14/93	Full	1
YMP-93-096.0 Test Interference Map Sheet 25	Mrotek/WCFS	6/14/93	Full	1
YMP-93-097.0 Test Interference Map Sheet 26	Mrotek/WCFS	6/14/93	Full	1
YMP-93-098.0 Test Interference Map Sheet 27	Mrotek/WCFS	6/14/93	Full	1
YMP-93-099.0 Test Interference Map Sheet 28	Mrotek/WCFS	6/14/93	Full	1
YMP-93-100.0 Test Interference Map Sheet 29	Mrotek/WCFS	6/14/93	Full	1
YMP-93-101.0 Test Interference Map Sheet 30	Mrotek/WCFS	6/14/93	Full	1
YMP-92-194.0 Thickness of Alluvium	Braumiller/M&O	6/14/93	Page	1
YMP-92-195.0 Thickness of the UN Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-196.0 Thickness of the Pah Canyon Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-197.0 Thickness of the Tuffs between the Tiva Canyon & Topopah Springs members	Braumiller/M&O	6/14/93	Page	1
YMP-92-198.0 Thickness of the Topopah Springs Tuffs	Braumiller/M&O	6/14/93	Page	1
YMP-92-199.0 Thickness of the Calico Hills Tuffs	Braumiller/M&O	6/14/93	Page	1

YMP-92-201.0 Combined Thickness of the Topopah Springs & Calico Hills Tuffs	Braumiller/M&O	6/14/93	Page	1
YMP-92-202.0 Thickness of the Bedded Tuffs Under the Calico Hills Tuffs	Braumiller/M&O	6/14/93	Page	1
YMP-92-203.0 Thickness of the Prow Pass Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-204.0 Thickness of the Bedded Tuffs Under the Prow Pass Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-205.0 Thickness of the Bullfrog Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-211.0 Thickness of the Bedded Tuffs Under the Bullfrog Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-212.0 Thickness of the Tram Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-213.0 Thickness of the Tram Lava	Braumiller/M&O	6/14/93	Page	1
YMP-92-214.0 Combined Thickness of the Tram Tuff and Lava	Braumiller/M&O	6/14/93	Page	1
YMP-92-215.0 Base of the Caprock of the Tiva Canyon Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-216.0 Base of the Tiva Canyon Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-217.0 Top of the Topopah Springs Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-218.0 Top of the Calico Hills Tuffs	Braumiller/M&O	6/14/93	Page	1

YMP-92-219.0	Top of the Prow Pass Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-220.0	Top of the Bullfrog Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-92-221.0	Top of the Tram Tuff	Braumiller/M&O	6/14/93	Page	1
YMP-93-184.0	Existing & Planned Water Table Boreholes	Dyer/YMPO	6/15/93	Full	25
YMP-92-031.2		McKinley/USGS	6/17/93	Page	1
YMP-92-033.2		McKinley/USGS	6/17/93	Page	1
YMP-92-036.1		McKinley/USGS	6/17/93	Page	1
YMP-92-037.3		McKinley/USGS	6/17/93	Page	1
YMP-92-038.2		McKinley/USGS	6/17/93	Page	1
YMP-92-039.2		McKinley/USGS	6/17/93	Page	1
YMP-92-040.2		McKinley/USGS	6/17/93	Page	1
YMP-92-041.2		McKinley/USGS	6/17/93	Page	1
YMP-92-042.2		McKinley/USGS	6/17/93	Page	1
YMP-92-043.2		McKinley/USGS	6/17/93	Page	1
YMP-92-044.2		McKinley/USGS	6/17/93	Page	1
YMP-93-070.0		McKinley/USGS	6/17/93	Page	1
YMP-93-070.1		McKinley/USGS	6/17/93	Page	1
YMP-93-112.0		McKinley/USGS	6/17/93	Page	1
YMP-93-133.1		McKinley/USGS	6/17/93	Page	1
YMP-93-145.0		McKinley/USGS	6/17/93	Page	1
YMP-93-147.1		McKinley/USGS	6/17/93	Page	1
YMP-93-148.1		McKinley/USGS	6/17/93	Page	1
YMP-93-160.0		McKinley/USGS	6/17/93	Page	1
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YMP-93-162.0		McKinley/USGS	6/17/93	Page	1
YMP-93-163.0		McKinley/USGS	6/17/93	Page	1
YMP-93-164.0		McKinley/USGS	6/17/93	Page	1
YMP-93-165.1		McKinley/USGS	6/17/93	Page	1
YMP-93-166.0		McKinley/USGS	6/17/93	Page	1
YMP-93-167.0		McKinley/USGS	6/17/93	Page	1
YMP-93-168.0		McKinley/USGS	6/17/93	Page	1
YMP-93-169.0		McKinley/USGS	6/17/93	Page	1
YMP-93-170.0		McKinley/USGS	6/17/93	Page	1
YMP-93-171.0		McKinley/USGS	6/17/93	Page	1
YMP-93-173.0		McKinley/USGS	6/17/93	Page	1

YMP-93-094.0 Test Interference Map - Sheet 23	Biggar/M&O	6/18/93	Full	1
YMP-93-093.0 Test Interference Map - Sheet 22	Biggar/M&O	6/18/93	Full	1
YMP-93-092.0 Test Interference Map - Sheet 21	Biggar/M&O	6/18/93	Full	1
YMP-93-088.0 Test Interference Map - Sheet 17	Biggar/M&O	6/18/93	Full	1
YMP-93-087.0 Test Interference Map - Sheet 16	Biggar/M&O	6/18/93	Full	1
YMP-93-082.0 Test Interference Map - Sheet 11	Biggar/M&O	6/18/93	Full	1
YMP-93-081.0 Test Interference Map - Sheet 10	Biggar/M&O	6/18/93	Full	1
YMP-93-080.0 Test Interference Map - Sheet 09	Biggar/M&O	6/18/93	Full	1
YMP-93-074.0 Test Interference Map - Sheet 03	Biggar/M&O	6/18/93	Full	1
YMP-93-075.0 Test Interference Map - Sheet 04	Biggar/M&O	6/18/93	Full	1
YMP-93-076.0 Test Interference Map - Sheet 05	Biggar/M&O	6/18/93	Full	1
YMP-93-132.1 Reported Activities Completed between 1 October 1992 & 31 March 1993 (Near Field)	Rixford/M&O	6/25/93	Page	3
YMP-93-133.2 Reported Activities Completed between 1 October 1992 and 31 March 1993 (Far Field)	Rixford/M&O	6/25/93	Page	3

YMP-93-026.0 Historical Seismic Activity	Von Seggern/UNR	6/28/93	Full	1
YMP-93-127.0 Existing & Proposed Boreholes	Von Seggern/UNR	6/28/93	Full	1
YMP-93-135.0 Potentially Useable Areas	Von Seggern/UNR	6/28/93	Full	1
YMP-93-138.0 NRC Tour Map	Von Seggern/UNR	6/28/93	Full	1
YMP-93-143.0 Existing Boreholes with Depth	Von Seggern/UNR	6/28/93	Full	1
YMP-93-144.0 Proposed Boreholes	Von Seggern/UNR	6/28/93	Full	1
YMP-93-184.1 Existing & Planned Water Table Boreholes	Simmons/YMPO	6/28/93	Full	25
YMP-92-146.2 Field Planning Map	Savino/SAIC	6/28/93	Page	1

TOTAL NEW MAPS 13

TOTAL MAPS 550



RSL YMP Support Office
EG&G Energy Measurements, Inc.
P.O. Box 1912, M/S: V-02
Las Vegas, Nevada 89125
Telephone: (702)794-7852
FAX: (702)794-7469

WBS: 1.2.5.3.6
QA: NA
TRACKING DESIGNATOR: NR93071302

TRANSMITTAL

Date Sent: 7-23-93

NAME: Carl Gertz TELEPHONE: 794-7920

ORGANIZATION: DBE/YMPO

ADDRESS: BOA, 101 Convention Center Drive, Las Vegas, NV 89109

SELECT ONE OF THE FOLLOWING:

FED-X CERTIFIED COMPANY MAIL HAND CARRY PICK UP BY CUSTOMER

One page size copy of:

- YMP-93-132.1
- YMP-93-133.2
- YMP-93-173.1
- YMP-93-177.0
- YMP-93-178.0
- YMP-93-179.0
- YMP-93-181.0
- YMP-93-182.0
- YMP-93-183.0
- YMP-93-183.1
- YMP-93-184.0
- YMP-93-184.1
- YMP-93-194.0

APPROVED BY:

C. Elaine Gye

DATE:

7/22/93

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EG&G ENERGY MEASUREMENTS

RSL YMP Support Office
 EG&G Energy Measurements, Inc.
 P.O. Box 1912, MS: V-02
 Las Vegas, Nevada 89125
 Telephone: (702)794-7852
 FAX: (702)794-7469

WBS: 1.2.5.3.6
QA: NA
TRACKING DESIGNATOR: NR93071302

WORK REQUEST

Today's Date: 7-13-93

TO BE COMPLETED BY THE REQUESTOR:

YMP Participant (Y/N) Y

NAME: Carl Gertz SIGNATURE: 

ORGANIZATION: U.S. DOE/YMPO TELEPHONE: 794-7920

ADDRESS: BOA, 101 Convention Center Drive, Las Vegas, NV 89109

PURPOSE OF PRODUCT: Monthly Progress Report

WILL THE PRODUCT BE USED IN QUALITY-AFFECTING WORK? NO DATE NEEDED: 7/28/93 RELEASABLE DATA (Y/N) Y

PRODUCT FORMAT	Hardcopy: <u>X</u>	Number of Copies: <u>1</u>	Map Size or Scale: <u>Page</u>	Other: <u>NA</u>
	Digital: <u>NA</u>	OS: <u>NA</u>	File Format: <u>NA</u>	Media: <u>Paper</u>

WORK DESCRIPTION:

Provide one page size copy of each of the following new map products generated during the month of June 1993:

- YMP-93-132.1
- YMP-93-133.2
- YMP-93-173.1
- YMP-93-177.0
- YMP-93-178.0
- YMP-93-179.0
- YMP-93-181.0
- YMP-93-182.0
- YMP-93-183.0
- YMP-93-183.1
- YMP-93-184.0
- YMP-93-184.1
- YMP-93-194.0

TO BE COMPLETED BY GENISES DATABASE PERSONNEL Job Number: N3P1P1BY

Cost Estimate (Y/N): NO Processing Plan (Y/N): NO Scheduled Delivery Date: 7/28/93

Map <u>X</u>	Data	Photo	Graphic	Image Process	GIS Analysis	DGI	Photo Acq	Data Submit	Internal Request	Other
--------------	------	-------	---------	---------------	--------------	-----	-----------	-------------	------------------	-------

RECEIVED BY:  DATE: 7-13-93
 APPROVED BY:  DATE: 7/13/93
(I have reviewed this form and all blanks are intentional)

WHITE: Record

BLUE: Customer

YELLOW: YMPSO Copy

PINK: RSL Copy

8533868ft
8530000m

8566660ft
8550000m

BUREAU OF
LAND MANAGEMENT

NELLIS AIR
FORCE RANGE

NEVADA
TEST
SITE

Location of Map YMP-93-132-1

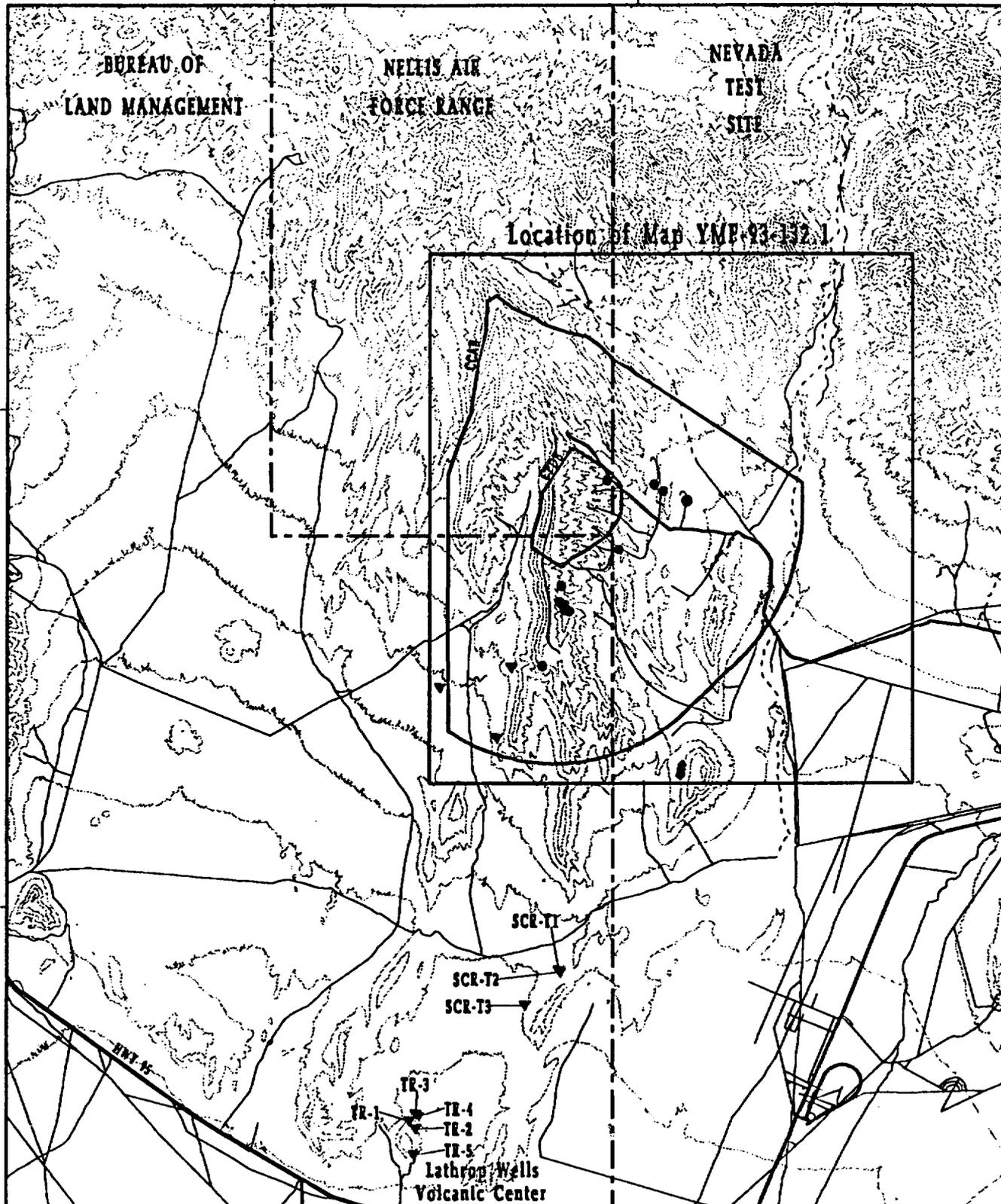
36° 51' 30"

36° 45' 00"

8500000
ELECTRON

8500000
ELECTRON

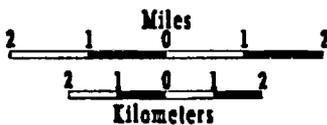
8500000
ELECTRON



116° 37' 30"

116° 30' 00"

116° 22' 30"



SURFACE ACTIVITIES

1 October 1992 TO 31 March 1993

- Borehole
- ▼ Trench
- ◆ Pavement

Contour Interval 200 Feet



**YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT**
Reported activities completed between 1 October 1992
and 31 March 1993 (Far Field)

E570200ft

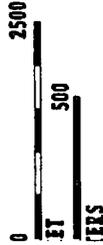
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YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

4 BOREHOLES
MEETING - JUNE 1993
P-1



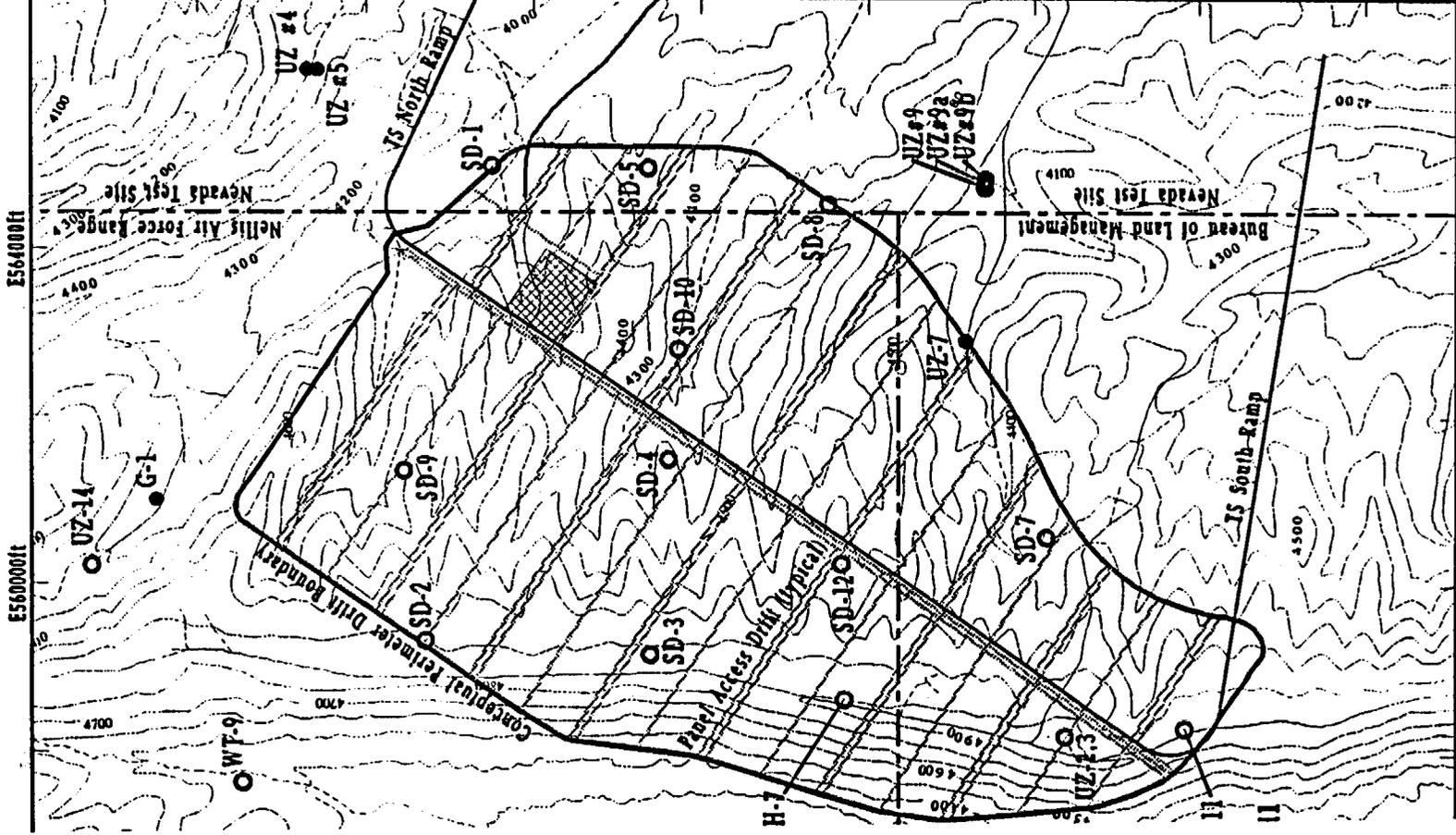
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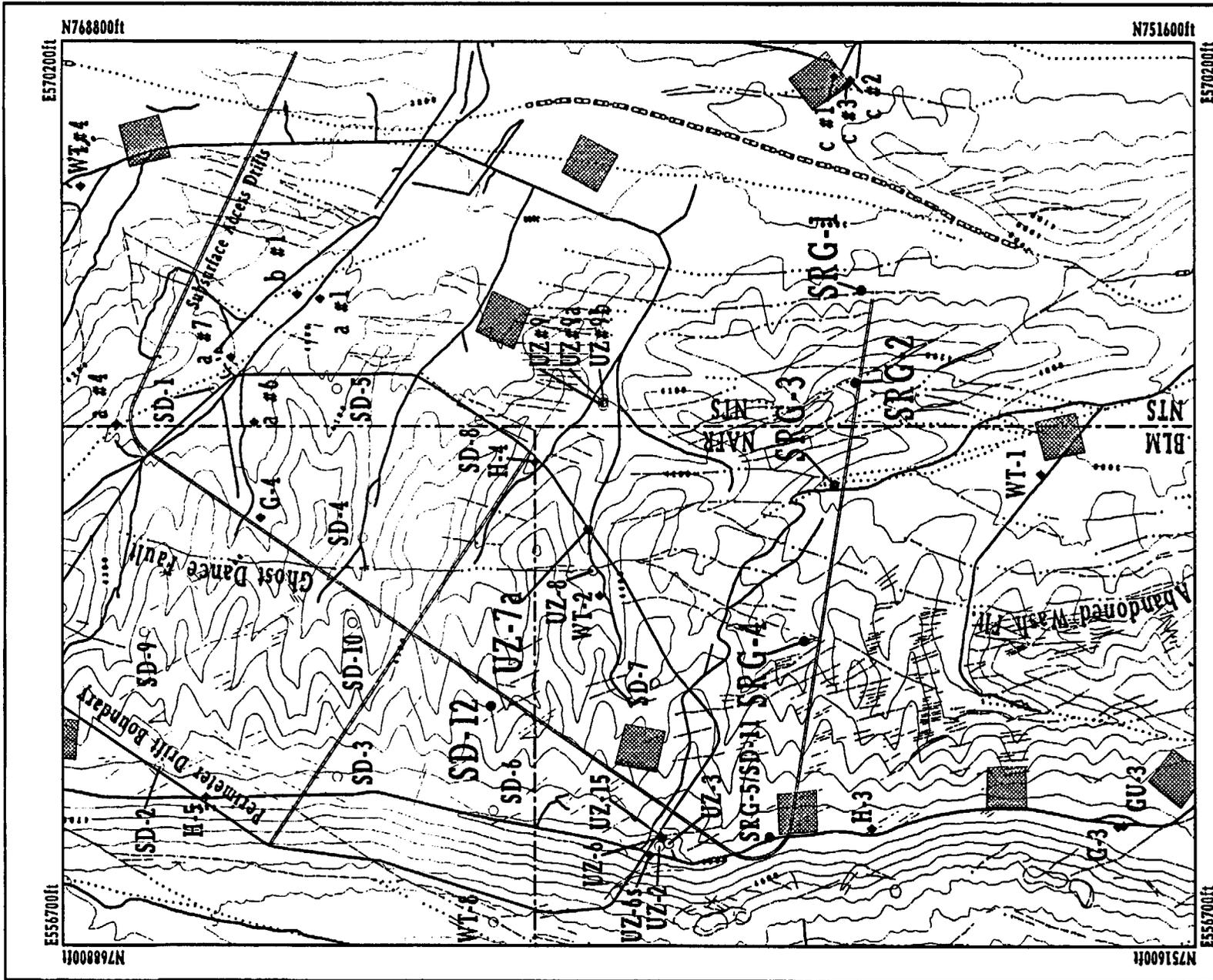
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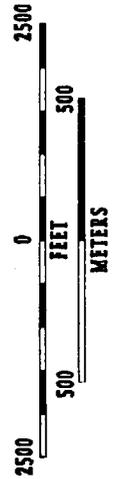


YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT PLANNED SD BOREHOLES

Contour Interval 100 Feet



**YUCCA MOUNTAIN
SITE CHARACTERIZATION PROJECT**
PLANNED PTH BOREHOLES
 WORKSCOPE CONSOLIDATION MEETING - JUNE 1993
 (MAP-3)



Contour Interval 100 feet
 YMP-93-179.0

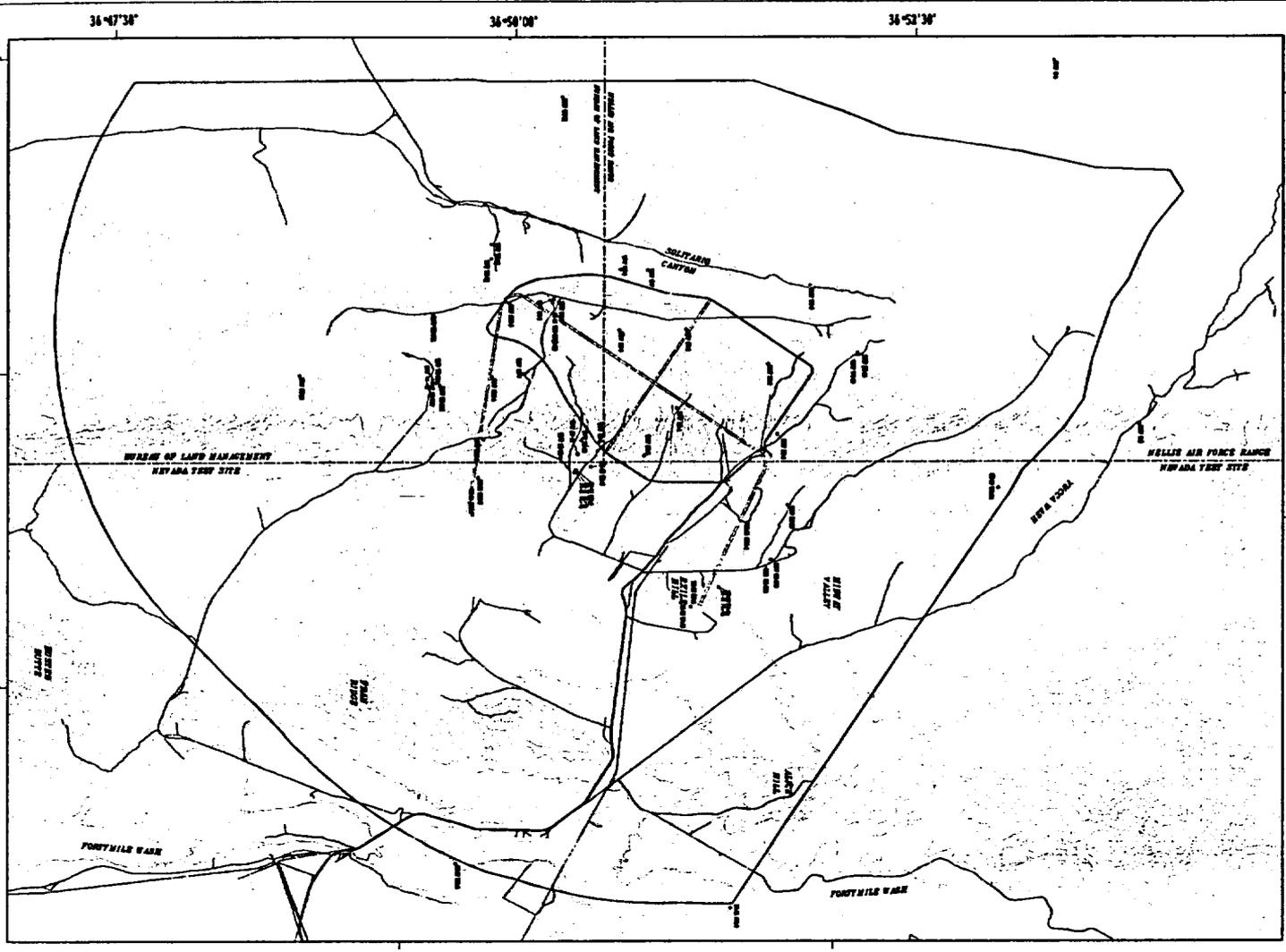
GEOLOGIC STRUCTURE

- Fault
 - Inferred Fault
 - Concealed Fault
 - Arenaceous Fracture
 - Fracture
- BOREHOLES**
- Planned PTH Borehole
 - Other Proposed Borehole
 - Existing Borehole Greater Than 900 Feet Deep
 - Ecological Study Plot
 - Road (Undifferentiated)

SOURCE:

Conceptual Perimeter Fault Boundary digitized from EarthScan Services World, drawing number W00-100; H-1, H-2, H-3, H-4, Conceptual Concealed Fault Boundary digitized from Santa Monica Laboratory drawing number CALIF-10; Subsurface Access Drifts and Drifts were digitized from EarthScan Services World, drawing number W00-001; UZ-1, UZ-2, UZ-3, UZ-4, UZ-5, UZ-6, UZ-7, UZ-8, UZ-9, UZ-10, UZ-11, UZ-12, UZ-13, UZ-14, UZ-15, Environmental Study Plot symbols digitized from EAC Environmental Sciences Division. Geologic Faults and Fractures digitized from USGS Operator Report #442; Hydrologic Geologic Map of Yucca Mountain, Big Chert, Area. Topographic contours obtained from U.S. Geological Survey 25000 scale Digital Line Graph (DLG) data. Contour Interval 100 feet. Road markers obtained from 1:50000 scale topographic atlas. Photo interpretation completed by MDC/PTL. Photo Coordinates, Central Area. Map compiled in June 1993 by EG&G. EG & G Geologic Services Laboratory. This map should not be used for quality-selecting work.

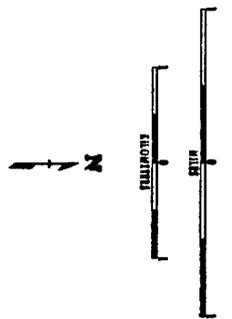
ESSEWAH
E1430000
BULLAHO
E330000



PROPOSED BOREHOLE ID	PROPOSED DEPTH (FEET)
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07-25 BT-2	no data
07-25 BT-3	no data
07-25 BT-4	no data
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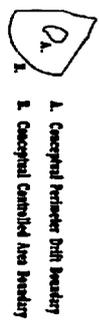
borehole not shown on this map

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT PROPOSED BOREHOLES (WITH DEPTH)



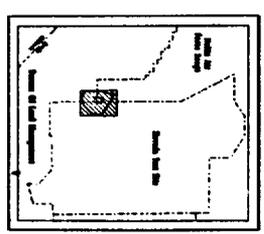
Proposed Borehole
Subsurface Access Ramps and Drifts

- ROAD FEATURES**
- ~ Light Duty Road, Class 3, Hard Surface
 - ~ Unimproved Road, Class 4, Gravel Surface
 - ~ Trail, Class 5, Four Wheel Drive or Other



Map shows proposed borehole locations from the Yucca Mountain Project. The map includes the following information:

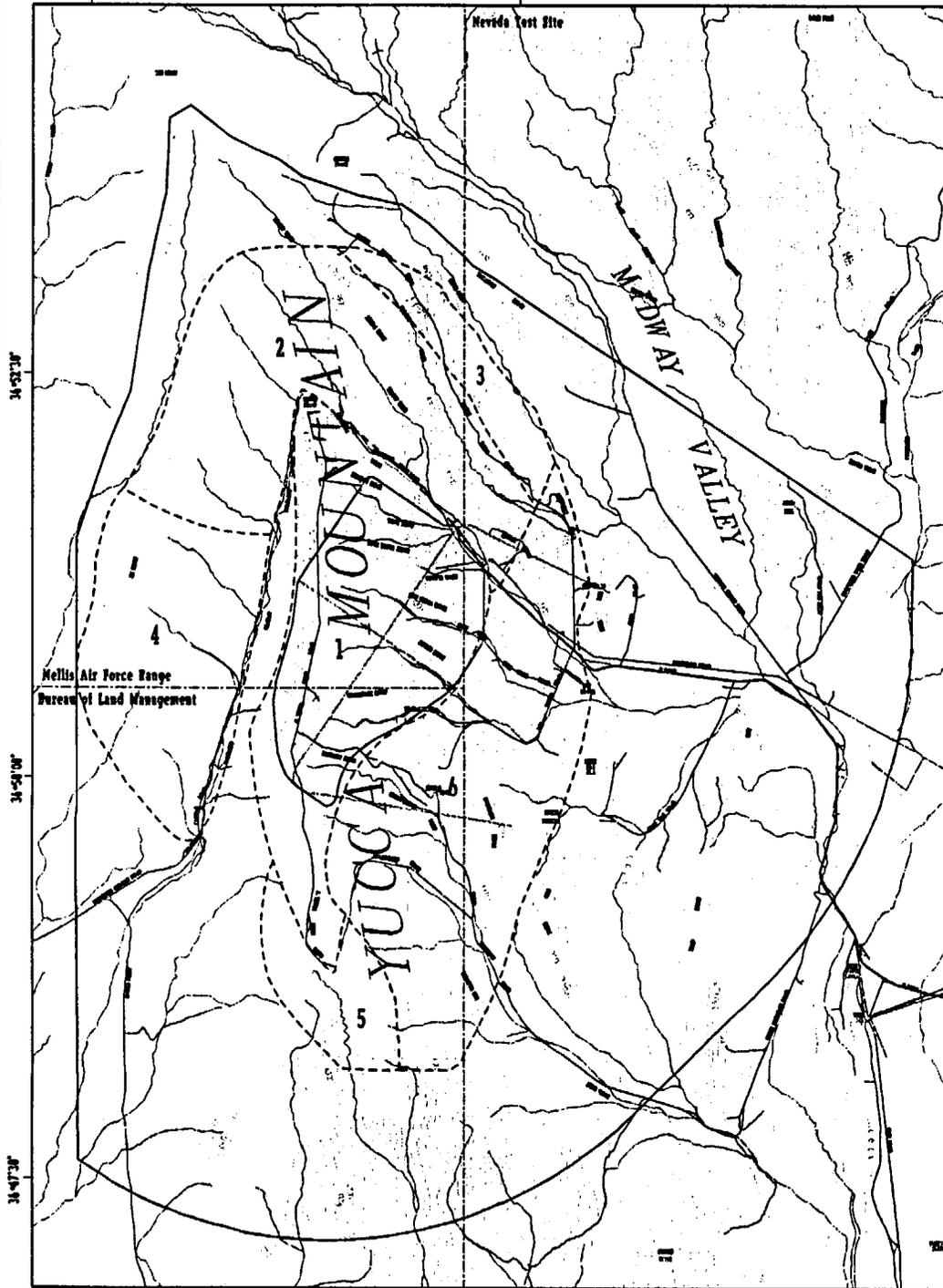
- Proposed borehole locations (see table).
- Proposed subsurface access ramps and drifts (see table).
- Proposed roads (see table).
- Proposed trails (see table).
- Proposed peripheral drift boundary (see table).
- Proposed central area boundary (see table).
- Proposed subsurface access ramps and drifts (see table).
- Proposed roads (see table).
- Proposed trails (see table).
- Proposed peripheral drift boundary (see table).
- Proposed central area boundary (see table).



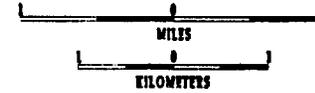
ES502451t
ES45000m

ES444691t
ES50000m

Nevada Test Site



YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT



ROAD FEATURES

- Light Duty Road, Class 3, Hard Surface
- - - Unimproved Road, Class 4, Gravel Surface
- Trail, Class 5, Four Wheel Drive or Other

STREAMS

- ~ Ephemeral Streams

Subsurface Access Ramps and Drifts

Potentially Useable Areas

A. Conceptual Perimeter Drift Boundary

B. Conceptual Controlled Area Boundary

SOURCE

Conceptual Perimeter Drift Boundary digitized from Nevada National Laboratories drawing number NP7004, April 1974.

Conceptual Controlled Area Boundary digitized from Nevada National Laboratories project number C20004.

Streams and Topographic Contours obtained from U.S. Geological Survey 1:250,000 scale Digital Line Graph (DLG). Contour interval 20 feet.

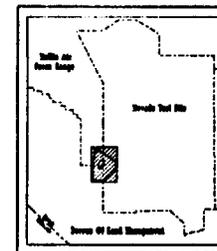
Road features obtained from 1:50,000 scale Orthophoto Stereos. Photo interpretation completed by 8800002 JPL.

Subsurface Access Ramps and Drifts were digitized from Earth Resources Service Stereo drawing number 100-454-100C-100A, May 1974.

Potentially Useable Areas were digitized from Facility Report 142504-001, Figure 2, Area 1 to the primary target area for the underground facility. Resolutions for all areas are approximate. The authors carry no responsibility for scaling.

Projections to Transverse Mercator. Map compiled to base 1960 by 8800 00 Stereo Reading Laboratory.

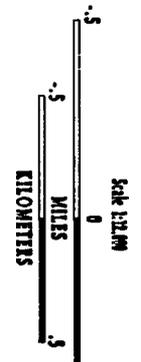
This map should not be used for quality-assessing work.





ES54000ft ES54000ft ES54000ft ES54000ft
 N768000ft N764000ft N760000ft N756000ft

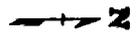
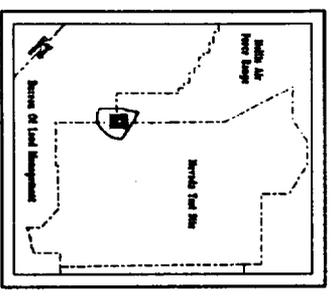
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT EXISTING BOREHOLES, REPOSITORY BLOCK AREA



- Existing boreholes
- ~ Fault
- ~ Inferred fault
- ~ Fracture
- ~ Potentially Useable Area of
- ~ Light Duty Load
- ~ Unaltered Load
- ~ Trail
- ▨ Alluvium
- ▨ 10 - Year Flood
- ▨ 50 - Year Flood
- ▨ Regional Britanna Flood

SOURCES

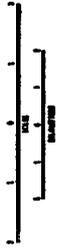
Borehole locations were obtained from Levels 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.



TM-5-113

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

EXISTING AND PLANNED WATER TABLE BOREHOLES



- ROAD FEATURES**
- ~ Two-Lane Paved, Class 1
 - ~ Two-Lane Paved, Class 3
 - ~ Unpaved Improved, Class 4
 - ~ Four Wheel Drive Trail, Class 5

BOREHOLES

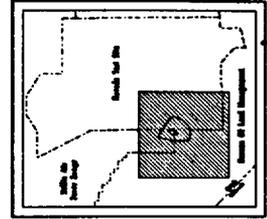
- Existing Water Table Borehole
- Planned Water Table Borehole

- A. Conceptual Perimeter Drift Boundary
- B. Conceptual Controlled Area Boundary



NOTES

Existing borehole locations were obtained from Table 1. However, the data obtained from the geophysical logs and the logs themselves are not available. The locations of the boreholes are shown on the map. The locations of the boreholes are shown on the map. The locations of the boreholes are shown on the map.



1/16/81

1/16/81

N770340ft
N4680000m

N704580ft
N4060000m

E599540ft
E560000m

E533840ft
E540000m

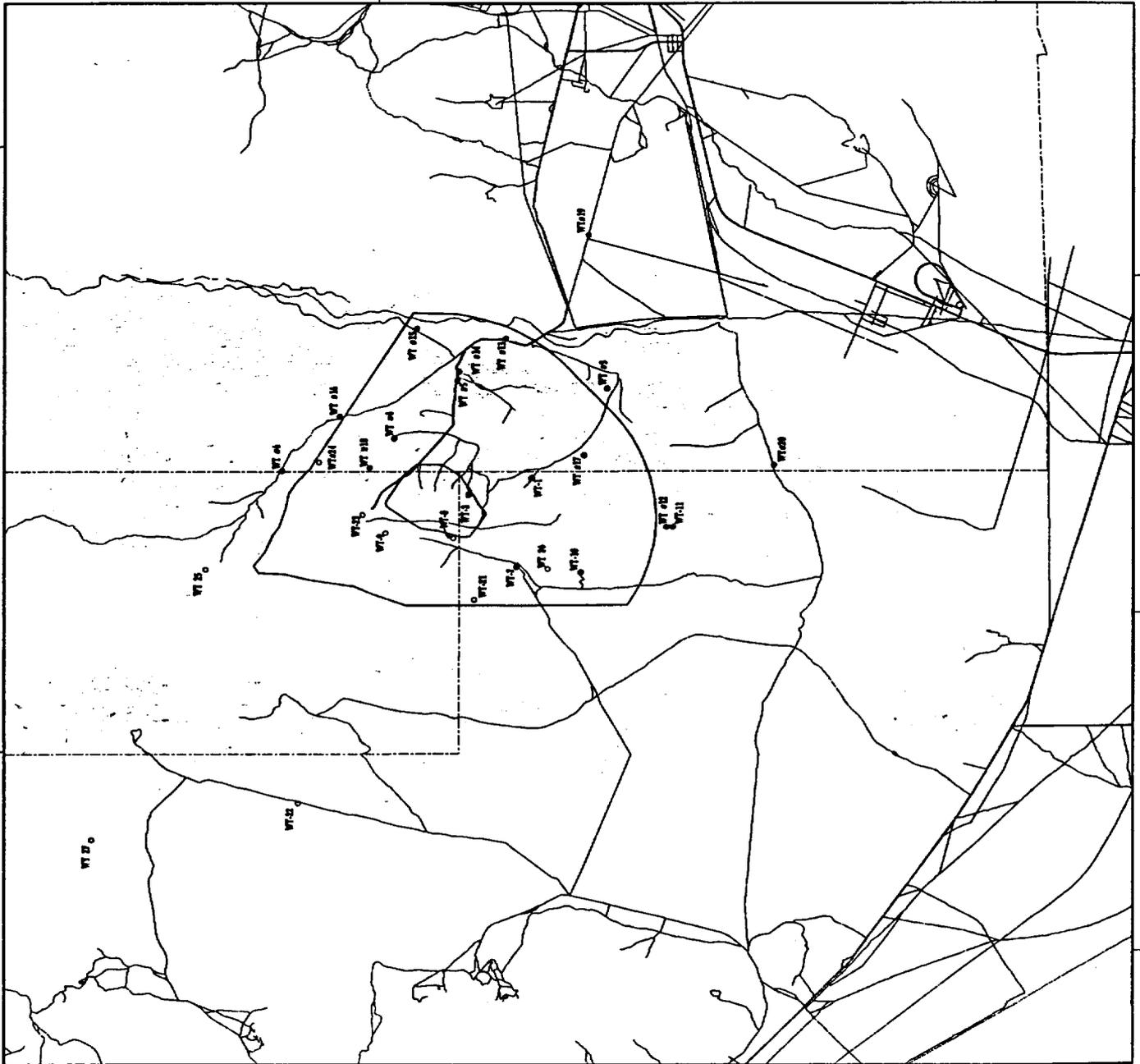
116 22'30"

116 30'00"

116 37'30"

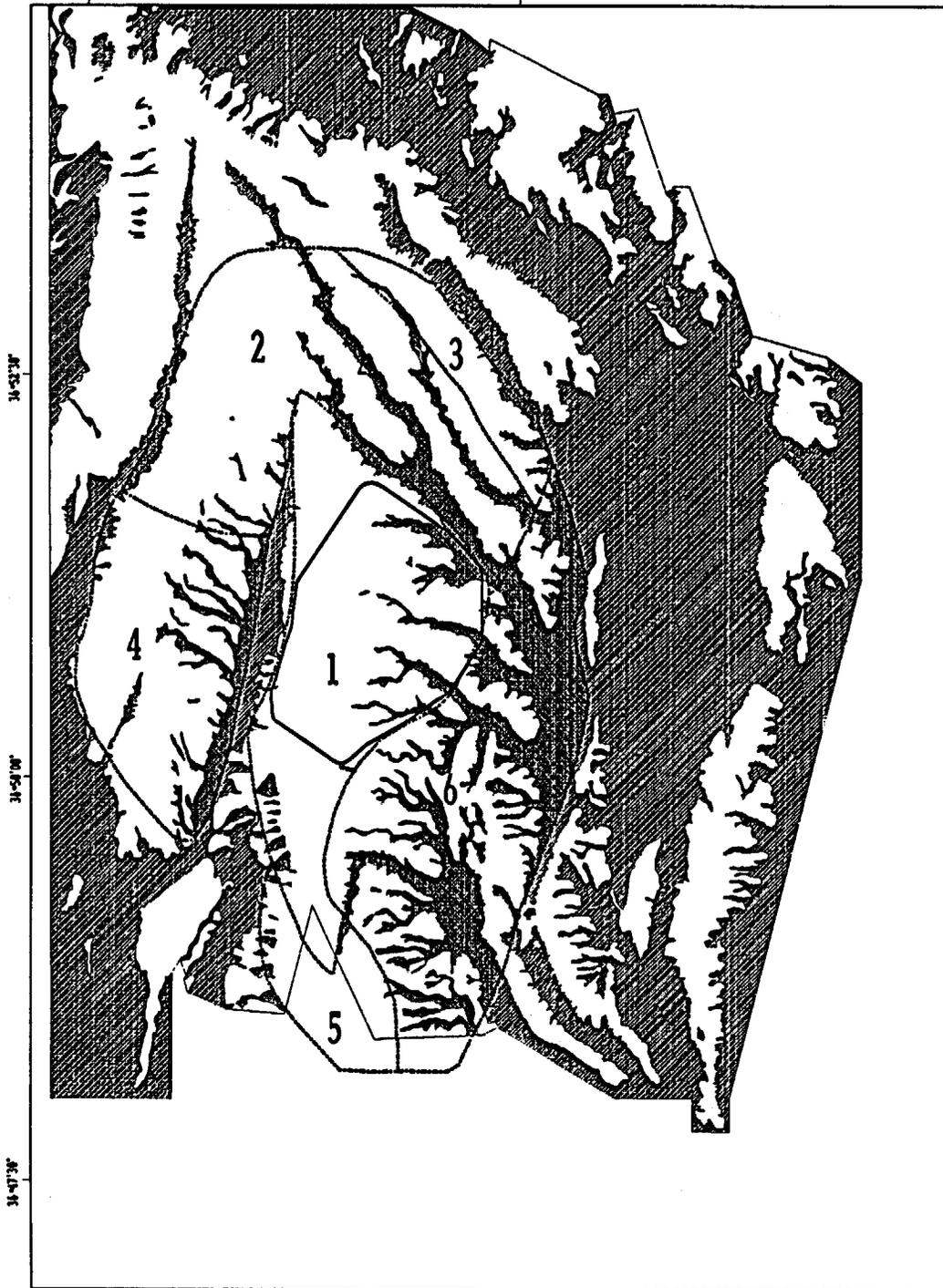
34-52-30

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8397245H
E545097m

E544440H
E550997m



YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT ALLUVIUM CONTACTS



LEGEND

-  Alluvium within Potentially Usable Area
-  Alluvium outside Potentially Usable Area
-  Alluvium/Bedrock Contact
-  Conceptual Perimeter Drift Boundary



Potentially Usable Areas

AREA	TOTAL AREA	TOTAL ALLUVIUM	PERCENT ALLUVIUM
1	94119016.00000	10143428.17012	10.8
2	94095312.00000	17094891.97712	17.7
3	18249719.00000	2534838.99901	14.0
4	64329794.00000	12457210.72371	19.4
5	29932942.00000	945441.94496	3.2
6	113294498.00000	51804772.613569	45.7

Area in square feet

NOTES

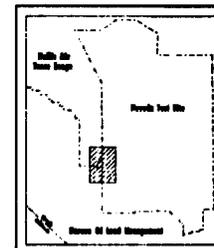
Geologic data obtained from South and North, 1961 Preliminary Geologic Map of Three Shields VMS, Geologic Institute, City County, Nevada, USGS.

Conceptual Perimeter Boundary digitized from USGS Inventory Number 070-400-001, Area 4.

Potentially Usable Areas digitized from Nevada Report 00000-017, Figure 1.

Prepared by Yucca Mountain, May 1993 by 000000 Nevada Geologic Institute.

This map should not be quality-checked.



DIVISION Clyde
CC: Magdalen/Widow
CC: Alpena
CC: Foreman
CC: Paul Berg
CC: Popper
CC: Kyler
CC: Lehmann
CC: William, S
CC: Metz
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Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

JUN 22 9 33 AM '93

WBS 1.2.9.1
QA N/A

June 14, 1993

TWS-EES-13-06-93-041

Mr. Carl P. Gertz, Project Manager
Yucca Mountain Site Characterization Project Office
US Department of Energy
P.O. Box 98608
Las Vegas, NV 89193-8608

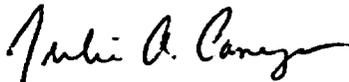
Dear Mr. Gertz:

Highlights of the Los Alamos Monthly Activity Report—May 1993

Attached are the highlights of the Los Alamos Monthly Activity Report for May 1993. This internal document describes our technical work; however, the report has not received formal technical or policy review by Los Alamos or the Yucca Mountain Site Characterization Project. Data presented in this document constitute predecisional information, should not be referenced, and are not intended for release from the U.S. Department of Energy as referenceable information.

If you have changes to our distribution list, please call Susan Klein at (505) 667-0916.

Sincerely,



Julie A. Canepa

SHK/elm

Attachment: a/s

Cy w/att:

- M. B. Blanchard, YMPO, Las Vegas, NV
- W. L. Clarke, LLNL, Livermore, CA
- W. R. Dixon, YMPO, Las Vegas, NV
- J. R. Dyer, YMPO, Las Vegas, NV
- N. Z. Elkins, EES-13/LV, MS J900/527
- L. D. Foust, CRWMS, M&O/TRW, Las Vegas, NV
- L. R. Hayes, USGS, Denver, CO
- V. F. Iorii, YMPO, Las Vegas, NV

- S. H. Klein, EES-13, MS J521
- M. Martin, M&O/TRW, Las Vegas, NV
- A. R. Pratt, EES-13, MS J521
- L. Shephard, SNL, Albuquerque, NM
- W. Simecka, YMPO, Las Vegas, NV
- M. Voegelé, SAIC, Las Vegas, NV
- RPC File (2), MS M321

Cy w/o att.:

CRM-4, MS A150

DIVISION _____
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 CC: Smith, L.
 CC: See Dist.
 CC: Legt (5)
 CC: Grodsky
 CC: Jones, S
 CC: _____
 CC: _____

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6/21/93

I-343505

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6-14-93

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1.3

MAY HIGHLIGHTS - LOS ALAMOS

WBS: 1.2.3.2.1.1.1 Mineralogy/Petrology

Work began on 59 core specimens from UE-25 UZ-16 that were received from the Sample Management Facility. These specimens range from the surface down to the quartz-lattice caprock of the Topopah Spring Member, and from the basal vitrophyre of the Topopah Spring Member into the Calico Hills Formation.

Sample selections were also requested from core NRG-6. Together, these two cores will provide needed mineralogic information for sections associated with the eastern imbricate fault zone and the northern boundary of the potential repository, respectively.

WBS 1.2.3.2.1.1.2 Alteration History

Schon Levy participated in a meeting of the team leaders of the Re-evaluation of SCP Thermal Goals Working Group in Las Vegas. Dave Bish prepared a draft evaluation of existing SCP thermal goals and made recommendations to modify some of the goals based on geochemical considerations.

Schon Levy visited N-Tunnel at Rainier Mesa with TCO and DOD/DNA personnel and representatives of the ESF wall mappers. The purpose of the visit was to examine flowing fractures and faults--features that may be encountered in the ESF. We were also interested in examining fluid gels that had been observed in this tunnel in the past. It was not possible to visit any of the reported gel locations because they are in unstable areas that have been sealed off. Schon also participated in a mapping and sampling session in the ESF North Ramp starter tunnel. Samples were collected from the first 35 ft of the tunnel. The sampling activity provided an opportunity to test and improve the logistics of the sampling operation.

WBS 1.2.3.3.1.2.2 Water Movement Test

The subcontractor, Hydro Geo Chem, completed processing a suite of 19 cuttings samples collected from UZ-16, from depths ranging from the surface down to 1171 ft, for chlorine-36 analysis, plus three groundwater samples from the Amargosa Desert.

WBS 1.2.3.4.1.1.A Groundwater Chemistry

Modeling of different radionuclides using compositions of groundwaters from Yucca Mountain continued. The highest Np and U concentrations were predicted in waters with the highest bicarbonate concentrations. EQ3/6 modeling confirmed the expected result, but there is still significant discrepancy between modeled and measured Np and U solubility. Incorporation of solubility data on different solid phases than those contained in the EQ3/6 data base should reduce the discrepancy (see solubility discussion).

WBS: 1.2.3.4.1.3 Solubility/Speciation of Radionuclides

We have initiated a stability constant study for Np(V) and Np(VI) using Carbon-13 and Oxygen-17 NMR. This work is in cooperation with ongoing UV-Vis-NIR solution studies. New stock solutions of oxidation state pure Np(V) and Np(VI) were prepared and characterized, and preliminary modeling of the Np solution was carried out in order to estimate a pH range of study.

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WBS 1.2.9.1
QA N/A

July 15, 1993

TWS-EES-13-07-93-037

Mr. Carl P. Gertz, Project Manager
Yucca Mountain Site Characterization Project Office
US Department of Energy
P.O. Box 98608
Las Vegas, NV 89193-8608

Dear Mr. Gertz:

Highlights of the Los Alamos Monthly Activity Report—June 1993

Attached are the highlights of the Los Alamos Monthly Activity Report for June 1993. This internal document describes our technical work; however, the report has not received formal technical or policy review by Los Alamos or the Yucca Mountain Site Characterization Project. Data presented in this document constitute predecisional information, should not be referenced, and are not intended for release from the U.S. Department of Energy as referenceable information.

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Sincerely,



Julie A. Canepa

SHK/elm

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L. Shephard, SNL, Albuquerque, NM
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M. Voegelé, SAIC, Las Vegas, NV
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TWS-EES-13 File, MS J521

Cy w/o att.:
CRM-4, MS A150

I-344908

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RPTS 1.3
7-15-93

June 1993 Highlights from Los Alamos

WBS 1.2.3.2.1.1.1 Mineralogy/Petrology

D. Vaniman and D. Bish presented an invited paper entitled "The Importance of Zeolites in the Potential High-Level Radioactive Waste Repository at Yucca Mountain, Nevada" at the Zeolite '93 conference in Boise, Idaho, 21-25 June. They evaluated the role of zeolites in waste retardation, site thermal loading, and site hydrology. Two posters were also presented at the meeting: "Equilibrium Modeling of the Formation of Zeolites in Fractures at Yucca Mountain, Nevada," by S. Chipera, D. Bish, and B. Carlos and "Distribution and Chemistry of Fracture-Lining Zeolites at Yucca Mountain, Nevada" by B. Carlos, S. Chipera, and D. Bish. Chipera presented information on the use of equilibrium thermodynamic modeling to understand the present-day mineral assemblage at Yucca Mountain, particularly the zeolitic assemblages. Carlos' paper discussed the variation in mineralogy and chemistry of fracture-lining zeolites across Yucca Mountain. All authors are preparing full papers for publication in the conference proceedings.

D. Bish gave an invited paper at the International Congress on Applied Mineralogy in Fremantle, Australia, on the applications of advanced x-ray powder diffraction methods to the study of natural zeolites. The Congress included one-day sessions on the health effects of minerals, on advanced x-ray diffraction (XRD) methods, on new image analysis techniques, and on a variety of thermal analysis methods. Bish also gave an invited presentation on clay mineralogy at the CSIRO in Melbourne, Australia.

An additional 25 samples of drill core from UE-25 UZ-16 were received from the SMF, bringing the total number of samples from this drill core available for bulk-sample XRD analysis to 84. One final group of samples, covering the central portions of the Topopah Spring Member, is anticipated to arrive shortly to provide a complete sample suite from UZ-16 for examination of major variations in mineralogical stratigraphy. We are continuing to prepare samples for analysis.

A copy of a 23 March memorandum from W. Wilson to R. Dyer (and others) was sent to members of this task by A. Simmons of the DOE. This memorandum discussed the results of XRD experiments on cutting samples from UZ-16; the results indicated that the samples were rich in mordenite. The Wilson memorandum refers to another memorandum from M. L. Pochowski stating that the dusts contained 5-15% mordenite. We believe that the Wilson memorandum may be misleading with regard to mineralogy and possible adverse health effects. Because of the importance of mineral health-effects issues, we are drafting a response to this memorandum.

On 2-3 June at the SMF, B. Carlos examined and scraped fractures in the Tram Member of the Crater Flat Tuff in UE-25b #1h and began preliminary examination of USW UZ-14 . Carlos also attended the 2 June SOC meeting.

WBS 1.2.3.2.1.1.2 Alteration History

Staff provided comments and corrections to the preliminary draft of the Thermal Goals Reevaluation Report prepared by S. Saterlie of the M&O. We are also continuing to make revisions and additions to the Los Alamos-contributed portions of the Calcite-Silica Topical Report.

S. Levy presented a dry-run of a talk on past mineralogical alteration at Yucca Mountain as an analog to potential future repository-induced alteration. D. Bish will present this talk to the Nuclear Waste Technical Review Board on 13 July.

G. WoldeGabriel and S. Bish presented invited papers at the Zeolite '93 meeting in Boise, Idaho. WoldeGabriel's paper entitled "K/Ar Dating of Clinoptilolites, Mordenite, and Associated Clays from Yucca Mountain" discussed K/Ar dating of zeolites. Bish's paper, "Thermal Behavior of Natural Zeolites," emphasized the variety of factors, both environmental and structural, that control natural zeolite stability.

WBS 1.2.3.2.5 Volcanism

We are wrapping up field studies at Lathrop Wells volcanic center so that a final geologic map of the center may be prepared.

Two field sessions were conducted. In the first, the thickness and clast-size distribution of the scoria-fall sheet formed during eruptions of the main cone were measured. In the second, revised contacts of the Q_{s6}/Q_{l6} unit were mapped on aerial photographs.

In the third session, we studied the distribution of ash in alluvial deposits several km from the main center and found clear evidence of two distinct tephra units separated by colluvium, with contrasting stages of pedogenic alteration and soil development. These outcrops provide the most convincing evidence to date that the Lathrop Wells volcanic center is a polycyclic volcanic (formed in multiple-time separate eruptive events). Field studies were coordinated with trench studies by the USGS along the Stagecoach fault. We believe that the evidence from both studies is conclusive, and that there were multiple time-separate eruptions at the Lathrop Wells volcanic center.

A task member made a presentation on the application of geophysical methods and the implications of these results to Volcanism studies at the Geophysical Technical Exchange with the NRC. Several task members made presentations and participated in open forums at the NRC Volcanism Technical Exchange.

WBS 1.2.3.3.1.2.2 Water-Movement Tracer Tests

Ten samples from UZ-16 were submitted to Purdue University for analysis of ^{36}Cl . Because of budget constraints, any additional precipitates prepared for analysis during FY93 will be archived until FY94, unless the issue to be resolved is particularly pressing.

WBS 1.2.3.4.1.3 Speciation/Solubility

D. Clark, D. Morris, H. Nitsche, and D. Tait participated in the second meeting of the YMP Radionuclide Solubility Working Group on 16 June in Las Vegas. R. Silva and J. Johnson of LLNL, M. Ebinger of Los Alamos, and A. Simmons of DOE/YMPO also participated. The meeting was an unqualified success and a number of important action items and champions were identified; the final report will be issued in July. The next meeting is tentatively scheduled for January 1994.

Solubility. We prepared solutions for a new series of experiments at 25°C in 0.1 M NaClO_4 (i.e., the neutral electrolyte experiments).

We used absorption spectroscopy to determine the speciation of Np in an undersaturation experiment in UE25p #1 water at 60°C and pH 6; the spectrum deconvoluted into two peaks. We also determined that this equilibrium solution contains $88.6 \pm 5.8\%$ NpO_2^+ and $11.4 \pm 6.3\%$ neptunium carbonate complex.

We were comparing the Np solid phases isolated from the oversaturation and undersaturation experiments in UE-25p #1 water. Of the three solids isolated from the undersaturation experiments, only that at pH 7 gave a solid that produced an x-ray diffraction pattern in agreement with its respective pattern from the oversaturation experiment. We believe it is probable that the solids are in fact ternary sodium neptunyl carbonates with varying hydrate stoichiometry. It is also possible that these solids are not sodium neptunyl carbonates.

WBS 1.2.5.4.6 - Caisson Experiment

The caisson has been filled and instrumentation has been placed. Filling of the caisson with water from the bottom to air vent was begun. The surface distribution system has been fabricated and it is being tested.

JUL 26 3 35 PM '00

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DIVISION
CC: lyer
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CC: harris
CC: brodsky
CC: Jones, S
CC: Ryan
CC: Blanchard
CC: Levy
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7/26/93

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WBS 1.2.9.1
QA N/A

July 14, 1993

TWS-EES-13-07-93-024

Mr. Carl P. Gertz, Project Manager
Yucca Mountain Site Characterization Project Office
US Department of Energy
P.O. Box 98608
Las Vegas, NV 89193-8608

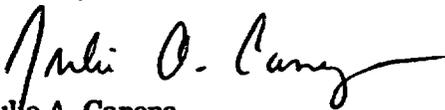
Dear Mr. Gertz:

Highlights of the Los Alamos Monthly Activity Report—May 1993

Attached are the highlights of the Los Alamos Monthly Activity Report for May 1993. This internal document describes our technical work; however, the report has not received formal technical or policy review by Los Alamos or the Yucca Mountain Site Characterization Project. Data presented in this document constitute predecisional information, should not be referenced, and are not intended for release from the U.S. Department of Energy as referenceable information.

If you have changes to our distribution list, please call Susan Klein at (505) 667-0916.

Sincerely,


Julie A. Canepa

SHK/elm

Attachment: a/s

Cy w/att:

M. B. Blanchard, YMPO, Las Vegas, NV
W. L. Clarke, LLNL, Livermore, CA
W. R. Dixon, YMPO, Las Vegas, NV
J. R. Dyer, YMPO, Las Vegas, NV
N. Z. Elkins, EES-13/LV, MS J900/527
L. D. Foust, CRWMS, M&O/TRW, Las Vegas, NV
L. R. Hayes, USGS, Denver, CO
V. F. Iorii, YMPO, Las Vegas, NV

Cy w/o att.:
CRM-4, MS A150

S. H. Klein, EES-13, MS J521
M. Martin, M&O/TRW, Las Vegas, NV
A. R. Pratt, EES-13, MS J521
L. Shephard, SNL, Albuquerque, NM
W. Simecka, YMPO, Las Vegas, NV
M. Voegele, SAIC, Las Vegas, NV
RPC File (2), MS M321
TWS-EES-13 File, MS J521

317
DIVISION _____
CC: Dyer
CC: Simecka
CC: Karin
CC: Proderky
CC: Jones, S
CC: New Dest
CC: Dest (2)
CC: Yer. 13
Smith, W. W. W. W. W.
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Newbury
William
Sullivan
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