



Department of Energy

Washington, DC 20585

APR 29 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.

Also enclosed for your information are U.S. Department of Energy responses to State of Nevada study plan comments. If you have any questions on the enclosed reports, please contact Priscilla Bunton at (202) 586-8365.

*Priscilla Bunton*

Linda J. Desell, Chief  
Regulatory Integration Branch  
Office of Civilian Radioactive  
Waste Management

Enclosures:

*in the Shuff*

- (1) EG&G/EM Remote Sensing Lab Support to the Yucca Mountain Site Characterization Project, March 1993
- (2) Los Alamos Monthly Activity Report Highlights, March 1993
- (3) Lawrence Livermore National Laboratory Yucca Mountain Project Status Report, March 1993
- (4) USGS Yucca Mountain Project Monthly Summary, March 1993
- (5) USGS Detailed Monthly Status Report, February 1993
- (6) DOE responses to State of Nevada Comments on Study Plan 8.3.1.17.3.1

100113

9305120212 930429

PDR WASTE  
WM-11

PDR

*102.8  
WM-11  
NH03*

cc:(w/out encl.)

C. Gertz, YMPO

(w/encl.)

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

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

APR 15 3 27 PM '00

April 14, 1993  
NV-93-279

Submitted to  
Project Office  
Lincoln 56

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

## MARCH 1 - MARCH 31, 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 March 1, 1993 through March 31, 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.

*John O Doyle*  
James Michael, Manager  
NV Program

CE:ns

Enclosures

DIVISION

RECORD

SOURCE

COPIES

DISTRIBUTION

1st (VHP)

2nd (Gertz/Johnson)

3rd (Morris)

COPIES

OCB BC

McLanahan/Foreman

Proskop/Gandi/H. Ray

4/15/93 Jones, S

ENCLOSURE 1

I-340378 B/M

4/14/93

Carl P. Gertz

**MARCH 1 - MARCH 31, 1993 PROGRESS REPORT - EG&G/ENERGY  
MEASUREMENTS REMOTE SENSING LABORATORY SUPPORT TO THE  
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT**

April 14, 1993

Page 2

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)  
~~K.~~ Grassmeier, DOE/YMP (w/o encl)  
J. Lorenz, REEC<sub>o</sub>/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  
4/29/93*

**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:** March 1, 1993 - March 31, 1993

**REPORT DATE:** April 14, 1993

**RESPONSIBLE INDIVIDUAL:** D.W. Brickey

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1. Clay Hunter (USGS) called to inform Dave Brickey on March 1 that it was his understanding that any files needed for the conversion from Lynx to Dynamic Graphics effort would be provided by Lynx. Dave's understanding was that Lynx would only provide the Wavefront formatted files and Jim Nelson (SAIC-Golden) would provide a vector formatted Lynx cross-section. Hunter also expressed concern about providing the Yucca Mountain model generated in Lynx. Dave assured him that the file would not be provided to anyone until it had been formally submitted to the Technical Database.
2. Jim Nelson spoke with Dave Brickey on March 8 and informed Dave that he was still under the impression that Lynx would provide all of the necessary files for the conversion effort. Nelson agreed to contact Garth Kirkham (Lynx) to confirm. Garth Kirkham called Dave later on March 8 to inform Dave that he had sent the Wavefront formatted files on March 1. Dave requested the vector 2-D cross-sections and Kirkham responded that the 2-D cross sections would not be of use and that we would need all of the cross-sections used in creating a GMS 3-D vector model. This could mean hundreds of cross-section files per model. Dave requested a 3-D GMS model file, but Kirkham said that the 3-D GMS model is proprietary.
3. Dave Brickey spoke with Jeffrey Schwalm (Dynamic Graphics) on March 16 regarding the Lynx to Dynamic Graphics conversion. Schwalm feels that the conversion of the 2-D vector cross-section files would be a better approach than trying to convert the Wavefront 3-D files.
4. After speaking with Jim Nelson, Simon Houlding, Chairman of Lynx Geosystems, contacted Dave Brickey on March 22. Houlding FedExed a complete package of documentation, an annotated plot and ASCII files of the plots and documentation. Dave indicated that he would like to provide this information to Dynamic

Graphics and Houlding indicated there would be no problem. Houlding also indicated that if a deeper understanding of the Lynx software was required for the conversion effort, it may be possible to make arrangements with proper agreements established up front.

5. Bob Craig (USGS) contacted Dave Brickey on March 29 to check that Lynx had provided the necessary materials for the format conversion effort.
6. Jim Nelson also contacted Dave Brickey on March 29 to check that Lynx had provided sufficient materials.
7. Dave Brickey transmitted a complete packet of the Lynx information to Jeffrey Schwalm on March 31.
8. Dave Brickey contacted Jet Propulsion Laboratory regarding visualization work. Dave received information concerning their visualization work applied to the experimental gigabyte network.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.**

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. Dynamic Graphics will evaluate the Lynx data formats and compile recommendations as to the required course of action to develop a format conversion.

**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:**                      March 1, 1993 - March 31, 1993

**REPORT DATE:**                        April 14, 1993

**RESPONSIBLE INDIVIDUAL:**    C.E. Ezra

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1.     Digitizing of the 1:6,000 scale disturbance features that were mapped by EG&G/EM from the 1990 orthophotographs continued.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1.     Digitizing of the EG&G/EM generated data will continue and preparation of data records packages will continue.

**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:            March 1, 1993 - March 31, 1993**

**REPORT DATE:            April 14, 1993**

**RESPONSIBLE INDIVIDUAL:   J. Beckett**

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1.    Jim Beckett attended a meeting with Martin Cummings (M&O/TRW/VA) on March 2 to discuss the Technical Data Management System and Configuration Management.
2.    A demonstration of the GENISES Technical Database was provided to the Technical Data Manager's staff on March 2.
3.    Jim Beckett met with Debbie Beiso-Lantor (LATA/SNL) on March 2 to discuss SNL submittals to the GENISES Technical Database.
4.    Jim Beckett met with Loretta Lopez, Rich Morley and Sidney Weaver (LANL) on March 3 to discuss LANL submittals to the GENISES Technical Database.
5.    Jim Beckett attended the March 4 Technical Data Working Group meeting.
6.    Jim Beckett met with Pat McKinley (USGS) on March 4 to discuss submittals to the GENISES Technical Database.
7.    Jim Beckett met with the M&O on the Parameter Dictionary numbering system on March 5.
8.    Jim Beckett met with Lew Robertson (M&O) on March 19 to provide a demonstration of the GENISES TDB system.



9. A meeting was held with Steve Bodnar and Bob Lewis (M&O) and Elaine Ezra and Jim Beckett on March 25 to discuss the structure of the Technical Database and how it relates to the Geographic Information System.
10. The SEPDB backlog report for each Participant was completed and provided to DOE/YMPO for distribution to Participants.
11. ArcView basemaps were installed on Dennis Williams' and Ardyth Simmons' (DOE/YMPO) personal computers.
12. The link between Arc/Info and INGRES was established in the GENISES database.
13. The following submittals to the GENISES Technical Database were received:
  - Open File Report 91-478 - Simulated Water Level Declines Caused by Withdrawals from Wells J-13 and J-12 Near Yucca Mountain Nevada was received from USGS on March 11.
  - Open File Report 90-369 - Geohydrologic Data From Test Holes UE-25 UZ#4 and UE#5 Yucca Mountain Area, Nye County, Nevada was received from USGS on March 11.
  - YMP/92-41-TPR - Topical Report. Evaluation of the Potentially Adverse Condition "Evidence of Extreme Erosion During the Quaternary Period" at Yucca Mountain, Nevada was received from SAIC on March 25.
  - Calcite Deposits in Drill Cores USW G-2 and USW GU-3/G-3 at Yucca Mountain, Nevada was received from LANL on March 25.
  - Dehydration and Rehydration of a Tuff Vitrophyre was received from LANL on March 25.
  - Preliminary Assessment of Clinoptilolite K/Ar Results from Yucca Mountain, Nevada, USA; A Potential High-level Radioactive Waste Repository Site was received from LANL on March 25.
  - Geological Evaluation of Six Non-welded Tuff Sites in the Vicinity of Yucca Mountain, Nevada, for a Surface Based Test Facility for the Yucca Mountain Project was received from LANL on March 25.

#### **MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:**

1. The GENISES database is understaffed by 1 FTE. Interviews for a database

specialist have been conducted and an offer is pending. It is anticipated that this position will be filled in early May. Filling this key position will significantly improve the turn-around time currently required to process a TDB submittal.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. The ArcView basemaps package and documentation will be submitted to DOE/YMPO.
2. The SEPDB backlog report will be completed and submitted to DOE/YMPO. This report will estimate the effort required by the GENISES staff to process the backlogged data into the GENISES TDB.
3. A draft of the GENISES database design report will be submitted to Ardyth Simmons (DOE/YMPO) 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 OE536B            SITE ATLAS**

**REPORT PERIOD:**                    March 1, 1993 - March 31, 1993

**REPORT DATE:**                     April 14, 1993

**RESPONSIBLE INDIVIDUAL:**   B. Kistler

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1.    Responses to the Site Atlas survey were compiled and provided to Ardyth Simmons (DOE/YMPO).
2.    Thirty black-and-white copies of the FY92 Site Atlas were completed and provided to Document Control for distribution as "Information Only" copies.
3.    The Table of Contents for the updated FY93 Site Atlas was drafted.
4.    A meeting was held with Norma Biggar (M&O/WCFS) and Barbara Kistler on March 5 to review the format of the Site Atlas Supplement Data Sheets. WCFS will assist in the collection of information about the planned activities needed for the Supplement.
5.    Barbara Kistler met with Bruce Crowe (LANL) on March 12 to discuss the volcanic data that should be included in the Site Atlas.
6.    Barbara Kistler met with Norma Biggar on March 23. Norma will begin gathering data for the planned activities for the Site Atlas Supplement. Barbara provided a digital copy of the Site Atlas Supplement data sheets for the planned activities.
7.    Barbara Kistler met with Dave Rohde and Paul Buck (DRI) on March 25 to discuss the archaeological data that should be included in the Site Atlas.
8.    Significant time and effort has been expended in telephone conversations with Principal Investigators and YMP scientific staff to track down planned activities for inclusion to the FY93 Site Atlas.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.**

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. Continued data collection and map preparation.

**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:            March 1, 1993 - March 31, 1993**

**REPORT DATE:            April 14, 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:
  - One 8mm tape containing hypsography of the Jackass Flats USGS 7.5' topographic quadrangle was provided to Frank Ennis (RSN) on March 3.
  - 10 color slides and 10 color viewgraphs of EG&G/EM negative #88B-181 entitled "Goal: Solve Existing Environmental Problem" were provided to Allison Inglett (SAIC) on March 4.
  - One viewgraph of the following map products were provided to John Gauthier (M&O-WCFS) on March 9:
    - YMP-93-027.5 - Borehole Program Activity
    - YMP-93-029.2 - Regional Investigations: Planned Trenches and Test Pits
    - YMP-93-030.2 - Site Area: Planned Trenches
    - YMP-93-048.1 - Proposed Seismic Reflection Profiling Lines
    - YMP-93-049.1 - Fran Ridge Pit and Pavement Area
    - YMP-93-027.6 - Borehole Program Activity
  - One blue-line copy of the 1:12,000 scale orthophotos (sheets 1-36) and 1:12,000 scale 20 foot elevation contours (sheets 1-36) were provided to Chris Fridrich (USGS) on March 9.

- An inventory of seismic data was provided to Katherine Larson (USGS) on March 9.
- Three viewgraph copies of "YMP-93-059.0 - Boreholes Secured as of February 1993" were provided to Mark Tynan (DOE/YMPO) on March 9.
- An INGRES report listing the descriptive information held in the GENISES database for study plans 8.3.1.2.2.3, 8.3.1.4.3.1, 8.3.1.2.2.7.1, and 8.3.1.2.2.4 was provided to Norma Biggar (M&O-WCFS) on March 10.
- An INGRES report listing the activity identifier, activity type, WBS, study plan and location coordinates for planned and existing activities was provided to John Gauthier (M&O-WCFS) on March 10.
- A list of current existing neutron boreholes, surface activities, and GSF test pits was provided to Tom Reynolds (M&O-WCFS) on March 11.
- One complete set of blue-line copies of the 1:12,000 scale orthophotos (sheets 1-36) were provided to Scott Lundstrum on March 16.
- An INGRES report listing the coordinate locations in Nevada State Plane, Universal Transverse Mercator and Latitude/Longitude for nine meteorological stations was provided to Paul Fransioli (SAIC) on March 17.
- One 3.5" diskette containing a digital copy of the TWIEZ boundary was provided to Lenny Badger (LANL) on March 18.
- One 3.5" diskette containing an ASCII file of the Digital Elevation Model data from the 1:6,000 scale orthophotos was provided to Alan Flint (USGS) on March 18.
- One 8.5" x 11" color print of EG&G/EM negative #7246-74 was provided to Carolyn Boyle (Clark County) on March 23.
- Ten 8.5" x 11" B&W prints and one 16" x 20" B&W print of EG&G/EM Negative No. 871579L were provided to Allison Inglett (SAIC) on March 23.
- Four 8.5" x 11" color prints of EG&G/EM Negative No. 91L1087L were provided to Allison Inglett on March 23.
- Three 8.5" x 11" color prints and three viewgraphs of EG&G/EM Negative No. 93C-070 were provided to Allison Inglett (SAIC) on March 23.

- One 11" x 14" color print of EG&G/EM Negative No. 88K-1089L was provided to Allison Inglett (SAIC) on March 23.
- An INGRES report listing the UZ-N boreholes updated in GENISES since 11/1/92 was provided to Tom Reynolds (M&O-WCFS) on March 23.
- Four 40" x 40" color duraflex copies of EG&G/EM Negative No. 921418L were provided to Jerry Lorenz (REECo/YMPO) on March 23.
- One 3.5" diskette containing the format for data sheets for planned activities for the 1993 Site Atlas Supplement was provided to Norma Biggar (M&O-WCFS) on March 24.
- Two color viewgraphs of the following map products were generated for Allison Inglett (SAIC) on March 24:
  - YMP-93-103.0 - Air Quality Meteorological Monitoring Sites
  - YMP-93-104.0 - Radiological Monitoring Sites
  - Ymp-93-102.0 - YMP Radiological and Meteorological Monitoring Sites
- An INGRES report of the activity identifier and northing/easting coordinates for Pavements 100 - 600 and 1000 was provided to Mike Fahy (USBR) on March 24.
- One 3.5" diskette containing as ASCII formatted files with the benchmark name, UTM easting, UTM northing and elevation for all benchmarks and RSN survey flags shown on map YMP-93-146.2 was provided to Kurt Rautenstrauch (EG&G/EM SBO) on March 25.
- One contact positive transparency of EG&G/EM Perf No. 7287 frames 18 and 25 were provided to Tim Algier (M&O-Fluor Daniel) on March 25.
- Two color duraflex prints of the following EG&G/EM Negatives were provided to Jerry Lorenz on March 26:
  - No. 90A-031L (36" x 36")
  - No. 6677-31 (36" x 30")

### **MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:**

1. The YMP GIS Map Production group is currently understaffed by 3.0 FTE, due to attrition and difficulty in hiring qualified GIS analysts. Interviews for GIS analysts have been and continue to be conducted. Several offers have been extended. It is anticipated that at least one of these positions will be filled in early May, and all positions filled by the end of June. Filling these positions will significantly improve our response time for GIS 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:            March 1, 1993 - March 31, 1993**

**REPORT DATE:             April 14, 1993**

**RESPONSIBLE INDIVIDUAL:   C.E. Ezra**

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1.    A survey for YMP Participants to identify any FY93 aerial photography acquisition requirements was submitted to Ardyth Simmons (DOE/YMPO) for review. The survey also addresses information about FY94 and beyond remote sensing data acquisition requirements.
2.    A cost estimate was prepared and submitted to DOE/YMPO for a request by Dennis O'Leary (USGS) to acquire low sun angle aerial photography of an area covering the eastern portion of the Yucca Mountain Site.
3.    A cost estimate was prepared for Bruce Crowe (LANL) for aerial photography and orthophoto/topographic mapping of the Sleeping Butte and Red/Black Cone areas. The total cost estimate will be submitted to DOE/YMPO upon receipt of a cost estimate for ground control and targeting from RSN.
4.    A cost estimate was prepared and is under internal review for a request by Dennis O'Leary (USGS) to acquire a thermal infrared scanner mission of an area covering the eastern portion of the Yucca Mountain Site. The cost estimate will be submitted to DOE/YMPO upon completion of the internal review.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.**

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. A list of remote sensing data collection systems and their specifications available through the DOE Remote Sensing Laboratory will be recompiled as an attachment to the YMP Remote Sensing Requirements survey.
2. The O'Leary (USGS) cost estimate for thermal infrared imagery will be completed and submitted to DOE/YMPO.
3. The Crowe (LANL) cost estimate for orthophoto and topographic mapping of the volcanic study areas will be completed and submitted to DOE/YMPO.

**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:**                    March 1, 1993 - March 31, 1993

**REPORT DATE:**                     April 14, 1993

**RESPONSIBLE INDIVIDUAL:**    C.W. Logan

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

1.    Continued progress was made on the hardware/software configuration plan.
2.    A SUN Microsystems representative visited the YMPSO and RSL/Nellis computer facilities on March 1 to install SUNstart, review the systems, and provide recommendations for system performance improvements.
3.    A meeting with a Solbourne vendor was held on March 3 at the YMPSO facility to discuss multiprocessing compute file servers.
4.    A PC ArcView software license was received and will be installed on a M&O (WCFS) Site Investigations machine.
5.    A meeting was held with Jim Michael, Ron Hamilton, Cliff Lloyd, Chuck Logan, Fred Bentley, Kent Ostler and Elaine Ezra was held on March 17 to discuss networking requirements and concerns for the RSL YMPSO. A task force will be initiated to develop the network plan.
6.    Three X-terminals were ordered.
7.    Memory upgrades for the SUN workstations were received and installed.
8.    The FY94 YMP Information Resources Management Short Range Plan was compiled and is under internal review.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:** None.

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. The YMP IRM SRP will be submitted to DOE/YMPO.
2. A GENISES representative will attend the IRM Council meetings April 27-28.
3. Dynamic Graphics, Inc. updates to Directed Well Display 3.0 and Display File Output 2.0 software modules will be installed on the SGI 3-D modeling workstation at the YMPSO.
4. EarthVision 1.0 and Explorer will be installed on the SGI 3-D modelling workstation at the YMPSO facility.
5. Two additional ArcView licenses will be installed on the YMPSO GENISES system.

**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:            March 1, 1993 - March 31, 1993**

**REPORT DATE:            April 14, 1993**

**RESPONSIBLE INDIVIDUAL:   C.W. Logan**

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:   None.**

1.    Research on FY93 capital equipment items has been initiated. A Solbourne representative visited YMPSO on March 3 to discuss their file server systems. Required specifications for the color electrostatic plotter were compiled and vendor demonstrations were scheduled.
2.    As per Wayne Kozai, EG&G/EM FY93 capital equipment funds should be available in the April FIN plan.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN:   None.**

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1.    Research on FY93 capital equipment items will continue.

**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:**                    March 1, 1993 - March 31, 1993

**REPORT DATE:**                    April 14, 1993

**RESPONSIBLE INDIVIDUAL:**    C.E. Ezra

**SUMMARY OF WORK ACCOMPLISHED DURING REPORT PERIOD:**

**1.     Reporting/Tracking**

- EG&G/EM RSL February Progress report was compiled and submitted to DOE/YMPO.
- February 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 March 1, March 9, March 15, and March 22.

**3.     Employee Actions:**

- Interviews for two Scientist II GIS analyst positions were initiated and scheduled for March.
- Interviews for the Technologist II position were held all day on March 16. Todd Radermacher was hired for the Technologist II computer support position and will begin on April 5.
- Three external candidates for an INGRES relational database management specialist were interviewed, and an offer is under preparation.

- Job requisitions for two Scientist I GIS analyst positions were internally posted.
4. **Records Management:**
- The records management quality assurance procedure has been drafted and is under internal review.
  - Joanna Wiggins met with Cindy Sellards (SAIC) on March 8 to review the EG&G/EM revised Records Management procedure.
  - Joanna Wiggins and Rose Broderick met with Carol Rixford (M&O-TRW) on March 12 to visit the Local Records Center and to discuss changes in the YMP Administrative Procedure 1.18Q.
5. **Quality Assurance:**
- A demonstration of the GENISES Technical Database and the process for submitting data to the database was provided to Debbie Mogar and Eddie Godfrey on March 16.
  - Joanna Wiggins met with Eddie Godfrey on March 19 to discuss applicable requirements of Criterion 2.

**MAJOR PROBLEMS AND CORRECTIVE ACTION UNDERTAKEN: None.**

**ANTICIPATED SIGNIFICANT EVENTS PLANNED DURING NEXT REPORT PERIOD:**

1. Interviews for the Scientist I and II positions will continue for qualified external applicants.
2. The QARD Requirements matrix will be completed.
3. Efforts to resolve the remaining Conditions Adverse to Quality will continue.
4. Elaine Ezra will attend the SPIE 1993 Symposium on Aerospace and Remote Sensing during the week of April 12 - 16.
5. Joanna Wiggins will attend the Records Coordinators meeting on April 26 - 27.
6. A GENISES staff representative will attend the IRM Council meeting scheduled for April 27 - 28.

7. **Chuck Logan will attend the Software Advisory Group (SAG) meeting in Denver on April 13.**
8. **Several GENISES staff members will attend the 4th Annual International High Level Radioactive Waste Management Conference and Exposition during the week of April 26 - 30.**



**Expenditures from January 25 to February 28, 1993**  
**(Dollars in thousands)**

<u>Task</u>	<u>Budget</u>	<u>February Cost</u>	<u>Total Costs To Date</u>	<u>Remaining</u>
WBS 1.2.3 Site Investigations	\$ 55.0	\$ 0.8	\$ 6.3	\$ 48.7
WBS 1.2.5 Regulatory	\$2,320.0	\$ 137.3	\$ 813.3	\$1,506.0
WBS 1.2.15 Support Services	<u>\$ 176.0</u>	<u>\$ 13.7</u>	<u>\$ 58.2</u>	<u>\$ 117.8</u>
TOTALS	\$2,551.0	\$ 151.8	\$ 877.8	\$1,672.5

**STATUS OF DELIVERABLES FOR EG&G/EM RSL SUPPORT TO YMP**  
**March 1, 1993 through March 31, 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-92-302.0 Test and Waste Isolation Evaluation Zone (Rev. 0)	Cambern/LANL	3/1/93	Page	4
YMP-93-047.2 Existing Boreholes & UZ-16	Boak/T&MSS	3/2/93	Page	1
YMP-93-055.0 Existing Boreholes with Proposed Exploratory Studies Facility	Boak/T&MSS	3/2/93	Full	1
YMP-92-167.0 Central Support Area Existing Site Plan	Pysto/SAIC	3/2/93	Page	1
YMP-92-131.0 Existing Activities	Justus/NRC	3/2/93	Full	3
YMP-92-132.0 Proposed Activities	Justus/NRC	3/2/93	Full	3
YMP-92-237.0 Air Quality & Meteorology Monitoring Sites in the YM Area	Justus/NRC	3/2/93	Full	3
YMP-92-257.0 Air Quality & Meteorology Monitoring Sites	Justus/NRC	3/2/93	Full	3
YMP-92-289.1 Proposed Seismic Reflection Line Locations & Proposed Deep Seismic Shothole Locations (Revised) NE Area	Agnew/M&O	3/2/93	Full	4

YMP-92-290.1 Proposed Seismic Reflection Line Locations & Proposed Deep Seismic Shothole Locations (Revised) SE Area	Agnew/M&O	3/2/93	Full	4
YMP-92-291.1 Proposed Seismic Reflection Line Locations & Proposed Deep Seismic Shothole Locations (Revised) SW Area	Agnew/M&O	3/2/93	Full	4
YMP-92-292.1 Proposed Seismic Reflection Line Locations & Proposed Deep Seismic Shothole Locations (Revised) NW Area	Agnew/M&O	3/2/93	Full	4
YMP-93-042.0 Near-Field Radiological Monitoring Sites	Tappen/T&MSS	3/3/93	Full	5
YMP-93-058.0 YMP, Test Well Power Planning	Lobo/SAIC	3/4/93	Full	2
YMP-93-059.0 Boreholes Secured as of February, 1993	Tynan/YMPO	3/9/93	Page	1
YMP-93-027.6 Borehole Program Activity	Gauthier/M&O	3/9/93	Page	1
YMP-93-027.5 Borehole Program Activity	Gauthier/M&O	3/9/93	Page	1
YMP-93-029.2 Regional Investigations: Planned Trenches & Test Pits	Gauthier/M&O	3/9/93	Page	1
YMP-93-030.2 Site Area: Planned Trenches	Gauthier/M&O	3/9/93	Page	1

YMP-93-048.1 Proposed Seismic Reflection Profiling Lines	Gauthier/M&O	3/9/93	Page	1
YMP-93-049.1 Fran Ridge Pit and Pavement Area	Gauthier/M&O	3/9/93	Page	1
YMP-93-052.0 Near-Field Meteorological Monitoring Sites	Tappen/T&MSS	3/9/93	Full	3
YMP-93-065.0 Proposed Location of NRG-3, January 19, 1993	Long/YMPO	3/11/93	Page	4
YMP-93-069.0 Proposed Location of NRG-3, January 19, 1993	Long/YMPO	3/11/93	Page	4
YMP-92-293.0	McKinley/USGS	3/12/93	Page	1
YMP-92-294.0	McKinley/USGS	3/12/93	Page	1
YMP-92-295.0	McKinley/USGS	3/12/93	Page	1
YMP-92-296.0	McKinley/USGS	3/12/93	Page	1
YMP-93-001.1	McKinley/USGS	3/12/93	Page	1
YMP-93-010.0	McKinley/USGS	3/12/93	Page	1
YMP-93-010.1	McKinley/USGS	3/12/93	Page	1
YMP-93-011.0	McKinley/USGS	3/12/93	Page	1
YMP-93-011.1	McKinley/USGS	3/12/93	Page	1
YMP-93-014.0	McKinley/USGS	3/12/93	Page	1
YMP-93-015.0	McKinley/USGS	3/12/93	Page	1
YMP-93-016.0	McKinley/USGS	3/12/93	Page	1
YMP-93-017.0	McKinley/USGS	3/12/93	Page	1
YMP-93-019.1	McKinley/USGS	3/12/93	Page	1
YMP-93-019.2	McKinley/USGS	3/12/93	Page	1
YMP-93-020.1	McKinley/USGS	3/12/93	Page	1
YMP-93-020.2	McKinley/USGS	3/12/93	Page	1
YMP-93-020.3	McKinley/USGS	3/12/93	Page	1
YMP-93-021.0	McKinley/USGS	3/12/93	Page	1
YMP-93-021.1	McKinley/USGS	3/12/93	Page	1
YMP-93-022.1	McKinley/USGS	3/12/93	Page	1
YMP-93-027.3	McKinley/USGS	3/12/93	Page	1
YMP-93-027.4	McKinley/USGS	3/12/93	Page	1
YMP-93-029.1	McKinley/USGS	3/12/93	Page	1
YMP-93-030.1	McKinley/USGS	3/12/93	Page	1

YMP-93-031.0	McKinley/USGS	3/12/93	Page	1
YMP-93-032.0	McKinley/USGS	3/12/93	Page	1
YMP-93-033.0	McKinley/USGS	3/12/93	Page	1
YMP-93-034.0	McKinley/USGS	3/12/93	Page	1
YMP-93-035.0	McKinley/USGS	3/12/93	Page	1
YMP-93-036.0	McKinley/USGS	3/12/93	Page	1
YMP-93-038.0	McKinley/USGS	3/12/93	Page	1
YMP-93-039.0	McKinley/USGS	3/12/93	Page	1
YMP-93-040.0	McKinley/USGS	3/12/93	Page	1
YMP-93-043.0	McKinley/USGS	3/12/93	Page	1
YMP-93-044.0	McKinley/USGS	3/12/93	Page	1
YMP-93-045.0	McKinley/USGS	3/12/93	Page	1
YMP-93-046.0	McKinley/USGS	3/12/93	Page	1
YMP-93-047.0	McKinley/USGS	3/12/93	Page	1
YMP-93-047.1	McKinley/USGS	3/12/93	Page	1
YMP-93-048.0	McKinley/USGS	3/12/93	Page	1
YMP-93-049.0	McKinley/USGS	3/12/93	Page	1
YMP-93-050.0	McKinley/USGS	3/12/93	Page	1
YMP-93-051.0	McKinley/USGS	3/12/93	Page	1
YMP-93-053.0 Far-Field TLD Station Locations	Tappen/T&MSS	3/12/93	Full	1
YMP-93-014.0 Existing & Proposed Trenches	Brodsky/YMPO	3/17/93	Full	1
YMP-93-015.0 Potentially Useable Areas with Existing Boreholes	Brodsky/YMPO	3/17/93	Full	1
YMP-93-016.0 Potentially Useable Areas with Proposed Boreholes	Brodsky/YMPO	3/17/93	Full	1
YMP-93-017.0 Existing & Proposed Test Pits	Brodsky/YMPO	3/17/93	Full	1
YMP-93-067.0 YMP, Evalua- tion of Recommended Boundaries	Morissette/SAIC	3/17/93	Full	1

YMP-93-068.0 YMP, 3-D Site-Scale Unsaturated Zone Hydrogeologic Model Boundary and Potentially Useable Areas	Morissette/SAIC	3/17/93	Full	1
YMP-93-302.1 Test & Waste Isolation Evaluation Zone	Badger/LANL	3/18/93	Page	3
YMP-93-066.0 Three-Dimensional Site-Scale Unsaturated Zone Hydrogeologic Model Boundary	Morissette/SAIC	3/19/93	Full	1
YMP-93-027.6 Borehole Program Activity	Hirsch/SAIC	3/24/93	Page	1
YMP-93-103.0 Air Quality & Meteorological Monitoring Sites	Inglett/SAIC	3/24/93	Page	2
YMP-93-104.0 Radiological Monitoring Sites	Inglett/SAIC	3/24/93	Page	2
YMP-93-102.0 YMP, Radiological & Meteorological Monitoring Sites	Inglett/SAIC	3/24/93	Page	2
YMP-92-125.0 Potential Hazards Map	Mendez-Vigo/USGS	3/25/93	Full	2
YMP-91-005.1 Roads Approved for Use Based on Completed Desert Tortoise Surveys Updated February 1991	Mendez-Vigo/USGS	3/25/93	Full	2
YMP-91-008.2 Orthophoto Sheet Index	Buck/DRI	3/26/93	Full	1
YMP-92-026.0 Historical Seismic Activity	Lorenz/REECO	3/30/93	Full	5

YMP-92-073.1 Tortoise  
Signposts Designating  
Limited Access

Kistler/EG&G/EM

3/30/93

Page

2

YMP-93-106.0 YM Area  
with Emergency Response  
Grid

White/YMPO

3/31/93

Page

1

Total New Maps 26

Total Maps 135

# Los Alamos

Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

APR 22 10 21 AM '93

WBS: 1.2.9.1  
QA/NA

April 16, 1993

TWS-EES-13-04-93-042

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:

**SUBJECT: HIGHLIGHTS OF THE LOS ALAMOS MONTHLY  
ACTIVITY REPORT - MARCH 1993**

Attached are the highlights of the Los Alamos Monthly Activity Report for March 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

JAC/fm

Cy:	M. B. Blanchard, YMPO, Las Vegas, NV	S. H. Klein, EES-13, MS J521
	W. L. Clarke, LLNL, Livermore, CA	M. Martin, M&O/TRW, Las Vegas, NV
	W. R. Dixon, YMPO, Las Vegas, NV	A. R. Pratt, EES-13, MS J521
	J. R. Dyer, YMPO, Las Vegas, NV	L. Shephard, SNL, Albuquerque, NM
	N. Z. Elkins, EES-13/LV, MS J900/527	W. Simecka, YMPO, Las Vegas, NV
	L. D. Foust, CRWMS, M&O/TRW, Las Vegas	M. Voegelé, SAIC, Las Vegas, NV
	L. R. Hayes, USGS, Denver	RPC File (2), MS J521
	V. F. Iorri, YMPO, Las Vegas, NV	TWS-EES-13 File, MS J521

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

DIVISION *Gertz*

CC: *Blanchard*

CC: *Dixon*

CC: *Dyer*

CC: *Law*

CC: *Simecka*

CC: *Grodsky*

CC: *Jones, S*

CC: *J*

REC'D IN YMP

4/21/93

I-340644

BMT

4/16/93



## **Monthly Highlights for March 1993 from Los Alamos**

**1.2.3.1 ESF Test Coordination and Integration.** The Test Coordination Office completed coordinating geologic mapping in conjunction with construction at the ESF north-ramp starter tunnel.

Staff completed Phase II of ESF testing and forwarded the following test planning packages (TPP) and job packages (JP) to the YMPO: Geologic Mapping, Perched Water, and Monitoring in Conjunction with North-portal Starter Tunnel Construction.

Staff revised the schedule for Phase III ESF testing to reflect the latest construction schedule.

Staff coordinated FY94 ESF testing capital equipment budget requests.

**WBS 1.2.3.1 Surface-Based Test Management and Integration.** Staff participated in the work scope consolidation by the M&O for SRG-5. TPP 92-16 and JP 92-17 (USW UZ-14) were signed for CI-36 sample collection from cuttings during borehole drilling.

**1.2.3.2.1.1.1 Mineralogy/Petrology.** On 10-11 March, D. Vaniman obtained samples of opal, calcite, and clay from exposed depths up to 18 m in the ramp starter tunnel. Because shallow intervals were often missed in the drilling program, these samples are excellent examples of mineral deposits that have been only rarely sampled in drill cores.

B. Carlos attended the March SOC meeting in Las Vegas and also examined UZ-16 and old core.

R. Raymond obtained probe data on Yucca Mountain clinoptilolites (from UE-25b #1H, UE-25a #1, G-2, G-4) to search for chemical variation, vertically and laterally and within large crystals.

Twenty-four fracture samples from drill holes USW G-1, G-2, GU-3, and G-4 were analyzed by X-ray powder diffraction (XRD), and goethite was seen for the first time at Yucca Mountain in sample USW G-2-2812.1. Re-analysis of previously collected fracture XRD data also confirmed goethite in sample USW G-2-3000.2. Both samples were from areas below the water table, and they each contained a significant amount of hematite (hematite >> goethite).

Images of material collected on filters located near rock saws at the SMF were obtained. New SEM images and analyses of erionite, mordenite, and palygorskite were obtained from Yucca Mountain samples.

G. Guthrie presented a briefing at the March TPO meeting on potentially hazardous airborne minerals at Yucca Mountain. He discussed research on mordenite as a possible carcinogen and pointed out that although researchers have not demonstrated that mordenite is carcinogenic, the existing data are of poor quality and were obtained with ill-defined samples.

**1.2.3.2.1.1.2 Mineral Alteration.** D. Vaniman and D. Bish attended a meeting (Las Vegas, 10-11 March) to discuss thermal loading effects. The discussion focused on cooperative studies on mineral stability by LLNL and Los Alamos. S. Levy and D. Vaniman met at the Sample Management Facility during the week of 15 March with representatives of the ESF wall mappers and others involved in ESF planning to discuss mineralogy-petrology sampling needs.

D. Vaniman, J. Whelan (USGS), and S. Levy and members of the mapping team visited the north ramp portal face, on the east side of Exile Hill, and noted several important features exposed in the portal face. These features included: (1) many fractures and lithophysal cavities in the densely welded Tiva Canyon wall rock coated and partly filled with waxy clay accumulations and (2) a few large-aperture fractures contain argillized silicic ash that may correspond to ash flows between the Tiva Canyon and Rainier Mesa tuffs.

D. Bish and S. Levy attended the USGS /CASY symposium on the effects of repository thermal loading on fluid movement and geochemistry at Yucca Mountain. Bish presented data on the mineralogical effects of short- and long-term heating of zeolites, smectite, and glass, and he emphasized that these phases can be affected simply by changing the water vapor pressure. Levy discussed natural hydrothermal alteration during the cooling of the Topopah Spring and Tiva Canyon pyroclastic deposits and its potential for natural analogue studies. Bish was appointed to the SCP Thermal Goals Working Group, which is evaluating SCP thermal goals. He will oversee geochemical and mineralogical considerations.

**1.2.3.2.1.2 Mineral Stability.** D. Bish met with H. Barnes of Pennsylvania State University and A. Lasaga of Yale University to discuss appropriate means of obtaining information on the reaction kinetics of minerals at Yucca Mountain. The study plan entitled Kinetics and Thermodynamics of Mineral Evolution at Yucca Mountain was being modified to reflect these recent interactions.

**1.2.3.2.3.1.A Volcanism.** Staff resumed trenching studies at the Lathrop Wells volcanic center. A soil pit was dug and enlarged to a trench (Qs<sub>1</sub>); soil units in the trench were interbedded with possible tephra deposits, and the tephra deposits exhibited lateral continuity through the trench walls, except where they were cross-cut by channels and infilled with aeolian sands or where they were bioturbated. Two soil pits were dug on the flanks of a Qs<sub>6</sub> scoria mound.

Staff completed additional measurements of the cosmogenic surface-exposure ages of the volcanic units at Lathrop Wells. Multiple sample sites from the Q15 lava showed consistent ages of about  $70 \pm 4$  ka. The consistency in the ages suggests the samples sites share a uniform exposure history and the ages may be close to the age of the lava flows. A surface scoria sample collected near summit of the main cone yielded an age of about 30 ka. A sample of welded spatter from the Qs2b fissure yielded a cosmogenic helium age of 49 ka.

Surface samples for cosmogenic helium studies were collected from a separate lobe of the Q15 lava, new sites were collected from surfaces of the Q13 and Q14 lavas, and a sample was collected from the Qs2d vents. Samples were collected from the interior of Q14b and the main cone.

Samples were collected for thermoluminescence (TL) age estimates of volcanic units at Lathrop Wells, and the quarry site was resampled to test the reproducibility of Holocene ages for soils interbedded with tephra. Soil and sediment samples were collected beneath the Q13 lava at two localities to test the reproducibility of previously studied sites. The TL ages for this lava unit are significantly younger than ages obtained by other geochronology methods.

The preliminary draft of the Volcanism Status Report was submitted to the DOE for distribution to the NRC.

**1.2.3.3.1.2.2 Water Movement Test.** Hydro Geo Chem submitted five YMP rock samples to Purdue University for chlorine-36 analysis as part of an interlaboratory comparison, and the Purdue results were within two standard deviations of those of LLNL and the University of Rochester. These results provided us with confidence in the reliability and reproducibility of the analyses over a wide range of concentrations. In addition, all 5 samples submitted to monitor background levels showed acceptably low, and reproducible, chlorine-36 results.

Hydro Geo Chem submitted a suite of 14 rock samples to LLNL for chlorine-36 analysis. The rock samples were derived primarily from the area of Paintbrush nonwelded that was intercepted by Neutron-access Boreholes UZ-N11, N37, and N53.

Chlorine-36 results were also obtained for two shallow-rock samples from UZ-N55. Previous chlorine-36 analyses had indicated contamination of cuttings samples collected from the depth interval 165 to 265 ft; the purpose of the most recent analyses was to determine whether the contamination extended to the surface samples. The results were well above meteoric background levels, although not as high as those for the deeper samples. This is probably because of dilution of the high signal by the higher *in-situ* chloride content of these near-surface samples.

Hydro Geo Chem began measuring chloride and bromide profiles on 64 samples UZ-16 received from the SMF; the depths of the samples ranged from surface to 1171 ft.

**1.2.3.3.1.3.1 Site Saturated Zone Groundwater Flow System.** B. Robinson revised the Los Alamos SQAP, which will be distributed for review.

Code development for SORBEQ was completed and staff was preparing the documentation as a Los Alamos report .

The C-Wells fractures selected for colloid transport experiments were cut into shapes appropriate for fitting with inlet and outlet flow ports. The manifolds, which are unique for each fracture specimen, were designed and the parts are ready to be machined. Staff was preparing to determine the experimental conditions and procedures to carry out flow and transport tests on a fractured sample of Bandelier tuff.

**1.2.3.4.1.2.1 Batch Sorption.** We are measuring sorption of Np onto tuffs and pure minerals as a function of Np concentration, groundwater composition, and temperature. This month we completed a set of batch sorption experiments using the following minerals: hematite, calcite, quartz, clinoptilolite, and tuffs G4-270 and G4-1506. The tuff, quartz, and natural calcite samples were wet-sieved to obtain particles in the size range of 75 to 500  $\mu\text{m}$ , and we pretreated the solid phases for two weeks with the groundwater (J-13 or UE-25p#1) in the ratio of 1 g of solid to 20 ml of solution. The Np solution was contained in Oak-Ridge tubes; the initial concentration was  $10^{-7}$  M; and the experiments were run at 25, 60, and 90°C. Preliminary results indicated that for Np, temperature has a very limited effect on the batch sorption coefficients. For all cases but calcite, the batch sorption coefficient for Np remained constant or increased very slightly as temperature increased. For calcite, the Np sorption distribution coefficient decreased with increasing temperature .

**1.2.3.4.1.3 Speciation.** Carbon-13 NMR experiments on U(VI) and Np(V) carbonates continued. Ionic strength corrections were applied to Nuclear Energy Agency data used by Project EQ3/6 modelers and compared to our recent carbon-13 and oxygen-17 NMR data. This comparison showed that NMR did an outstanding job of working out thermodynamic binding constants and revealing which species were present in solution, albeit at higher concentration. This data will be compared to low-concentration speciation data, which was collected using PAS.

**Solubility.** The oxidation-state assay for the Np experiment in UE-25p #1 at pH 8.5 and 60°C was completed, and no Np(IV) was found; however, 17% of the total Np may be in the hexavalent oxidation state ( $\text{NpO}_2^{2+}$ ). For the Am/Nd undersaturation experiments in UE-25p #1 water at 60°C, the initial

solution concentrations at all pH values were comparable to those obtained at the end of the oversaturation experiments.

Milestone 3329, "Measured Solubilities and Speciations from Oversaturation Experiments of Neptunium, Plutonium, and Americium in UE-25p #1 Well Water from the Yucca Mountain Region" was revised in response to reviewer comments. Four Technical Data Information Forms were completed for Milestones 3010, "Measured Solubilities and Speciations of Neptunium, Plutonium, and Americium in a Typical Groundwater (J-13) from the Yucca Mountain Region," and 3329, "Measured Solubilities and Speciations from Oversaturation Experiments of Neptunium, Plutonium, and Americium in UE-25p #1 Well Water from the Yucca Mountain Region."

D. Clark, S. Ekberg, D. Morris, H. Nitsche, P. Palmer, and D. Tait attended the 205th National Meeting of the American Chemical Society in Denver, CO, March 28 - April 2, 1993. Mr. Phillip Palmer received the National Technician of the Year award at this meeting.

**1.2.3.4.1.4.1/2 Diffusion.** I. Triay completed the first draft of the Colloid Workshop report entitled "Colloid-Facilitated Radionuclide Transport at Yucca Mountain." This report describes YMP colloid research, which will evaluate whether colloids will significantly increase radionuclide release from a potential repository at Yucca Mountain to the accessible environment. She identified research needs in the areas of colloid sampling, colloid generation, colloid stability, radionuclide sorption onto colloids, and colloid migration.

**1.2.3.4.1.5.1 Physical/Chemical Processes Affecting Transport.** Three-dimensional grids for Yucca mountain were generated. These grids follow the stratigraphy closely and will be compared with previous three-dimensional runs on regular meshes. The advantage of our gridding technique is that the coarse grid can automatically be refined to a fine grid, while preserving the stratigraphy. As soon as we receive the newest three-dimensional stratigraphy from the USGS, we will discontinue using the Sandia data we are now using.

**1.2.3.4.1.5.2 Development and Validation of Flow and Transport Models.** Final approval of the Special Work Permit for the caisson was received, and work began on installing the lower-boundary device on March 17. Weather conditions hindered the placing of the porous cups because temperature must be above 40°. Installation of the lower-boundary device should be completed by April 7.

**1.2.5.2.2 Site Characterization Plan.** The DOE topical report entitled "Evaluation of the Potentially Adverse Condition 'Evidence of Extreme Erosion during the Quaternary Period' at Yucca Mountain"

was completed and published (DOE report YMP/92-41-TPR [March 1993]). C. Harrington provided significant input to the technical section of this report.

**1.2.5.4.7 Supporting Calculations for Postclosure Performance Analysis.** Air-water diffusion terms were added to the computer code FEHM; this part of the code will be the subject of a new milestone entitled "Summary Report on Thermal Repository Calculations," due 30 September 1993.

**1.2.6A Exploratory Studies Facility.** Staff scheduled and coordinated a meeting on consolidation of thermal testing in the ESF; it was attended by representatives of SNL, LLNL, CRWMS M&O, and Los Alamos. Staff met with representatives of the Colorado School of Mines to discuss mechanical methods for the mining of the ESF.

**1.2.11.2/3/5 Quality Assurance.** Staff submitted a draft of "Implementation Matrix (R1)," "Detailed Transition Plan (R2)," and "Impact Analysis (R1)" to YMPO. We anticipate completion of activities to implement the new QARD by August; our major emphasis will be on procedure revisions. Forty-three quality administrative procedures (QPs) must be revised to satisfy new QARD requirements.

C. Mechels was hired as Software Management Coordinator.

Five audit reports were completed and total of eight deficiency reports were issued to the following organizations: CAR-92-10, Lawrence Berkeley Laboratory; AR-92-11, Hydro Geo Chem; AR-92-13, EES-4 & EES-15; AR-92-16, Test Coordination Office; and AR-92-17, EES-13 software). Corrective action report CAR-YM-93-018 was closed by YMPO.