



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Reply to:
301 E. Stewart Ave., #203
Las Vegas, NV 89101

Tel: (702) 388-6125

TO: Joseph Holonich, Director, HLPD, M/S 4 H 3
FROM: Sr. On-Site Representatives Office, Las Vegas
DATE: October 9, 1992
SUBJECT: OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE
WEEKS ENDING SEPTEMBER 11, 18, AND 25, 1992

Please find enclosed the above-referenced reports.

There is nothing requiring specific management attention in the reports.

cc: w/enc.: Charlotte Abrams, M/S 4 H 3
Rosetta Virgilio, M/S 3 D 23
Dean Kunihiro, Region 5

nan

NOTE TO CHARLOTTE ABRAMS: Also enclosed is: the Daily Operations Reports, Weekly Interactions Report, Field Test Coordinator's Reports (9/21-25, 9/14-18, 9/8-11/92); LANL August Monthly Activity Report

see enclosed on shelf

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PDR WASTE
WM-11
PDR

ADD: Charlotte Abrams

Ltr. Encl.
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WM-11
NH03

*Rec'd with letter
dtd. 10/9/92*



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

WBS 1.2.9.2
QA: N/A

OCT 02 1992

**John W. Bartlett, Director, Civilian Radioactive Waste Management,
HQ (RW-1) FORS**

**OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE WEEK ENDING
SEPTEMBER 25, 1992**

**I. CRITICAL ITEM STATUS - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
(YMP)**

A. Site Characterization Planning

Field Operations

The Site Manager and Field Operations Center staff participated in and provided logistical support for seven major tours this reporting period. All plans for support to the public open house and site tour, which are scheduled for September 26, 1992, have been completed. Approximately 350 participants are expected to attend.

Drilling activities at the UZ-16 borehole continue with the LM-300 drill rig. As of September 22, 1992, Reynolds Electrical & Engineering CO., Inc. (REECO), drilled to a depth of 744.76 feet and reamed to 719.04 feet.

Regarding USW UZN-31, the fourth neutron access borehole of the second series of twelve boreholes, drilling was completed to a depth of 192.59 feet as of September 22, 1992. REECO is relocating the drill rig to USW UZN-32. Additional fill was placed at the USW UZN-32 drill pad.

On Job Package (JP) 92-8, Soil and Rock Properties at Midway Valley, REECO completed excavation of the even-numbered test pits 26 through 38.

On JP 92-7, Fran Ridge Pit Mapping, cleaning of the bedrock with high pressure air and water for geologic mapping continued.

Sample Management Facility

Processing of core and cuttings from UE25 UZ-16 continued. Drilling operations on and processing of core and cuttings from USW UZN-31 were completed. Support was initiated for drilling operations on USW UZN-32. Began processing of specimen removal request approved at the September 1992, Sample Overview Committee meeting.

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Site Investigations

Mapping of trenches excavated for Study Plan (SP) 8.3.1.17.4.2, "Evaluation of the Location and Recency of Faulting Near Prospective Surface Facilities," and SP 8.3.1.17.4.6, "Quaternary Faulting Within the Site Area," continued.

Phase II test pits excavations have been completed. Mapping and sampling of test pits excavations continued.

Technical Analysis

Jeremy Boak, representing the U.S. Department of Energy (DOE), attended the National Academy of Sciences (NAS) meeting in Washington, D.C., regarding the U.S. Environmental Protection Agency (EPA) criteria for 40 CFR 191.

Regulatory Interactions

Susan Jones (Yucca Mountain Site Characterization Project Office [YMPO]) presented a briefing on issue resolution and Annotated Outline (AO) processes to the National Association of Regulatory Utility Commissioners on September 24, 1992. The Regulatory & Site Evaluation Division (RSED) completed informal reviews of the five project-level requirements documents.

Mined Geologic Disposal System (MGDS) AO

Comments on Revision 1 of the MGDS AO were incorporated into the document. Delivery to the U.S. Nuclear Regulatory Commission (NRC) is on schedule for next week.

Issue Resolution

Claudia Newbury, Richard Crawley, April Gil, and Ardyth Simmons (RSED staff) participated in the Historical Earthquakes of the Northern Basin and Range field trip to investigate surface ruptures from historic earthquakes in that region.

Seismic Hazards Working Group members also participated in the field trip to examine areas of recent earthquake activity. The field trip included numerous examples of Basin and Range faulting and discussions on earthquake magnitude, recency of faulting, appearance of faults and related deposits, and possible analogs to Yucca Mountain, Nevada.

Site Characterization Plan (SCP) SP Status

One new SP revision was submitted to YMPO this week:
SP 8.3.1.5.1.3, Revision 1, "Climatic Implications of Terrestrial
Paleoecology." YMPO approved one SP revision: SP 8.3.1.17.3.4,
Revision 1, "Effect of Local Site Geology on Surface and Subsurface
Motions."

STUDY PLAN BREAKDOWN

| | |
|---|----|
| In Screening Review | 0 |
| In YMPO and DOE/Headquarters (HQ) Review | 2 |
| Awaiting Comment Resolution | 12 |
| Awaiting Author Revision | 5 |
| In YMPO/HQ Verification Audit | 4 |
| Preparing to Submit or Awaiting YMPO Approval | 5 |
| Awaiting Submission to the NRC | 1 |
| NRC Phase 1 Review | 16 |
| NRC Acceptance | 28 |
| Total | 73 |

SCP/SP Status:

| | |
|---|-----|
| Total SPs Assigned to Cover 106 Studies | 103 |
| SPs Not Yet Submitted for Review | 38 |
| SPs Submitted for Initial Review | 65 |
| Revised SPs Submitted for Review | 8 |
| Total SPs Submitted for Review | 73 |

State of Nevada Comments Status:

| | |
|--|----|
| Received Comments from the State of Nevada | 10 |
| Responses Transmitted to the State of Nevada | 9 |

NRC Comments Status:

| | |
|--|----|
| Received Comments from NRC | 18 |
| Responses Transmitted from OGD to DOE/HQ | 11 |

B. Project Planning and Control

YMP Division Directors were briefed on the August 1992 cost and schedule variances.

The fiscal year (FY) 1993 Budget Process briefing was prepared and presented to the Project Manager and Division Directors.

All arrangements were completed for transitioning the Planning and Control System (PACS) to the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O). Exit interviews were conducted on September 25, 1992.

The new work breakdown structure (WBS) crosswalk in the PACS interim data base, including crosswalking the Long Range Plan/Integrated Project Schedule, has been completed.

Reports of the new WBS were prepared for the participants. Deliverables are being met on time based upon the revised schedule.

C. Quality Assurance (QA) Implementation

Determination of Importance and Grading Enhancement

Quality (Q) List and Q-List Procedure Development

New delivery dates will be established for Sandia National Laboratories (SNL) submittal of the Items Important to Waste Isolation and Items Important to Safety reports.

Implementation

The Assessment Team is resolving operational issues, particularly with the Raytheon Services Nevada Exploratory Studies Facility design package classifications.

D. Public Outreach and Institutional Activities

Institutional and External Affairs (IEA) personnel staffed the YMP and transportation container exhibits at the Pahrump Harvest Festival in Pahrump, Nevada, September 18-19, 1992. Approximately 212 people viewed the exhibits at the festival; also, approximately 75 people viewed the container at the Pahrump Yucca Mountain Information Office.

The IEA staff customized and staffed exhibits at the Las Vegas Home Show September 18-20, 1992, in Las Vegas, Nevada, and at the Lawrence Livermore National Laboratory's (LLNL) 40th Anniversary Open House/Family Days, September 19-20, 1992, in Livermore, California. Approximately 650 people visited the two exhibits.

Carl Gertz, Project Manager, gave a technical presentation to an audience of chemists and engineers at the Emerging Technologies for Hazardous Waste Management conference on September 21, 1992, in Atlanta, Georgia. Over 200 people attended. Carl Gertz also gave a technical presentation to the National Association of Regulatory Utility Commissioners (NARUC) on September 24, 1992, in Las Vegas.

A. C. Robison (YMPO) escorted tours to Yucca Mountain for 15 guests of the CRWMS M&O Program Management Review on September 22, 1992, and for five guests of NARUC on September 25, 1992. A tour to Yucca Mountain was conducted on September 23, 1992, for 30 guests of the Beatty, Nevada, Chamber of Commerce.

Approximately ten people attended the Yucca Mountain Lecture Series, "Are the Keys to Ancient Cultures Being Destroyed?" presented by Paul Buck (Desert Research Institute) on September 24, 1992, in Beatty.

On September 24, 1992, A. C. Robison provided a general overview presentation to the Uptown Kiwanis Club in Las Vegas. Carl Gertz gave a general overview presentation to an audience of vice-presidents and administrative researchers for universities west of the Rocky Mountains on September 25, 1992, in Las Vegas. Approximately 65 people attended the presentations.

The IEA's Publications and Exhibits staff received new products from commercial vendors and the REECO Print Plant. They distributed them as packets that included the three-page folder, "Why Are Scientists Studying Yucca Mountain?" and the following fact sheets:

1. "What is Nuclear Fuel and Waste?"
2. "Nevadans' Average Annual Radiation Exposure"
3. "Studying the Movement of Rocks and Earthquakes"
4. "Volcanoes and Yucca Mountain"
5. "What Happens During Site Characterization"
6. "The Cultural Resources Program—Preservation Through Cooperation"
7. "Yucca Mountain Site Characterization Project Field Operations Guide."

Additionally, interim-stage fact sheets entitled "Nuclear Waste Repositories and Carbon-14 Emissions" and "An update on the Ghost Dance Fault" have been developed.

II. ANALYSIS & VERIFICATION DIVISION

The staff participated in the DOE Seismic Hazards field trip September 19-22, 1992, in Reno, Nevada.

The staff attended the Advisory Committee on Nuclear Waste (ACNW) 46th Meeting September 22 and 25, 1992, in Bethesda, Maryland. Topics of interest included the recent EPA consideration of Carbon-14 release limits and the NRC proposed guide on 10 CFR 20 ALARA (as low as is reasonably achievable) criteria. Also, they attended the NAS/National Research Council Board on Radioactive Waste Management Workshop on the EPA standard, 40 CFR Part 191, September 23-24, 1992, in Washington, D.C.

The verification review under AP 1.10Q was completed for SP 8.3.1.2.3.3, "Site Saturated-Zone Hydrologic System Synthesis and Modeling;" it was initiated for SP 8.3.1.17.3.5, "Ground Motion at the Site From Controlling Seismic Events."

Preparations were initiated for Chapter 1 and the Executive Summary of the Seventh SCP Progress Report.

Initiated a review of the predecisional draft Office of Civilian Radioactive Waste Management Regulatory Guidance Document. Review comments were requested to be forwarded to RW-332 by September 30, 1992.

Review of the MGDS System Requirements Document was also initiated. Comments are due to the CRWMS M&O review coordinator on October 8, 1992.

III. GENERAL INFORMATION ITEMS

CRWMS M&O

The final report for Mission 2001, which was scheduled for issuance on September 18, 1992, was delayed until the end of this week.

A meeting was held with DOE on September 24, 1992, regarding thermal loading of the repository. An action plan for FY 1993 activities to resolve thermal loading was discussed. It was agreed that a task and budget presentation will be provided to YMPO on October 1, 1992.

SNL

Waste Isolation analyses were completed for NRG-6.

LLNL

Scoping calculations that link the results of thermal-hydrological calculations to fluid-rock interaction are being conducted. Specific regimes were identified in which particular equilibrium conditions could be recognized. These early calculations suggest that chemical equilibrium will be approached in regions near the waste package.

Refluxing of water has been suggested as a mechanism that can heal fractures and alter the hydrology of the mountain. Refluxing was examined at low heat loads for extended dry scenarios. At the lowest thermal loading (20 kW/acre, 30-year old fuel), the refluxing at the repository horizon is about five times higher than the ambient refluxing driven by the existing geothermal gradient. At 36 kW/acre of 30-year old fuel (the same waste distribution as the SCP-CD reference case of 57kW/acre of ten-year old fuel), the refluxing is about 90 times higher than ambient refluxing. For extended dry scenarios, postboiling refluxing at the repository horizon will be precluded by lack of moisture until late times, when the temperature gradients are substantially reduced.

LOS ALAMOS NATIONAL LABORATORY

The staff participated in a Nuclear Waste Technical Review Board (NWTREB) meeting on volcanism in Las Vegas, September 16-18, 1992. Presentations included the probabilities and effects of volcanism and characterizing volcanic features. The staff also participated in a Geochemistry Integration Team meeting in Las Vegas on September 17, 1992.

IV. UPCOMING EVENTS CALENDAR

Please note that the usage of "(P)" in the calendar indicates that the event is open to the public. Educational presentations and State and Public Interactions are handled by the Speakers Bureau; contact Theresa Hirsch at (702) 794-7759 for additional information. Exhibits are handled by Kevin Rohrer at (702) 794-7769, and tours are handled by Carleen Hill at (702) 794-7375.

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|---|--------------------|---------------------|
| <u>A. DOE/HQ Meetings</u> | | | |
| Monday, October 26 | Program Management Meeting | Washington, DC | C. Gertz |
| <u>B. CRWMS M&O/DOE Meetings</u> | | | |
| Friday, September 25 | Performance Management Meeting | Las Vegas, NV | C. Gertz |
| Wednesday, October 28 | M&O Program Review | Vienna, VA | C. Gertz |
| <u>C. Internal and DOE/NV Meetings</u> | | | |
| Wednesday, October 21 | NV Monthly Program Review | Las Vegas, NV | C. Gertz |
| <u>D. NRC Interactions</u> | | | |
| Thursday, October 29 (Tentative) | Technical Exchange - Functional Analysis of 10 CFR 60 (P) | San Antonio, TX | T. Bjerstedt |
| Tuesday, November 17 | Technical Exchange - Volcanism (P) | Albuquerque, NM | T. Bjerstedt |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|---|--|-----------------|---------------------|
| D. <u>NRC Interactions</u> (Continued) | | | |
| TBD | Interaction Planning Meeting (P) | Rockville, MD | T. Bjerstedt |
| Monday-Tuesday, December 14-15 | Technical Exchange - Total System Performance Assessment (P) | Rockville, MD | T. Bjerstedt |
| E. <u>NWTRB Interactions</u> | | | |
| Wednesday-Thursday, September 30-October 1 | NWTRB Dry Run | Las Vegas, NV | J. Cooper |
| Wednesday-Thursday, October 14-15 | NWTRB Full Board Meeting (P) | Las Vegas, NV | J. Cooper |
| Friday, October 16 | NWTRB Yucca Mountain Site Tour (P) | Las Vegas, NV | J. Cooper |
| Wednesday-Friday, November 4-6 (Tentative) | NWTRB SG&G Panel Meeting (P) | Denver, CO | J. Cooper |
| Wednesday-Friday, November 18-20 | Workshop on Expert Judgment (P) | Albuquerque, NM | A. Simmons |
| Tuesday-Wednesday, January 5-6, 1993 | NWTRB Full Board Meeting (P) | Arlington, VA | J. Cooper |
| February or March 1993 TBD | NWTRB HG&G Panel Meeting (P) | TBD | J. Cooper |
| Tuesday-Friday, April 20-23, 1993 | NWTRB Full Board Meeting (P) | Reno, NV | J. Cooper |
| Tuesday, June 1, 1993 | NWTRB International Trip (P) | TBD | J. Cooper |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMFO Contact</u> |
|---|---|------------------|---------------------|
| E. <u>NWIRB Interactions (Continued)</u> | | | |
| Monday- Thursday, July 12-15, 1993 | NWIRB Full Board Meeting (P) | Denver, CO | J. Cooper |
| Tuesday- Friday, October 19-22, 1993 | NWIRB Full Board Meeting (P) | Las Vegas, NV | J. Cooper |
| F. <u>ACNW Interactions</u> | | | |
| Tuesday, October 20 | ACNW WG on Human Intrusion (P) | Las Vegas, NV | A. Gil |
| Wednesday, October 21 | ACNW 47th Meeting (P) | Las Vegas, NV | A. Gil |
| Thursday, October 22 | ACNW Yucca Mountain and NPS Tours (P) | Las Vegas, NV | A. Gil |
| Friday, October 23 | ACNW GIS Tour (P) | Las Vegas, NV | A. Gil |
| Monday- Tuesday, November 16-17 | ACNW 48th Meeting (P) | Bethesda, MD | A. Gil |
| Wednesday, November 18 | ACNW WG Climate (P) | Bethesda, MD | A. Gil |
| Wednesday, December 16 | ACNW WG on PA - Phase 2 HLW Inter- active PA by NRC (P) | Bethesda, MD | A. Gil |
| Thursday- Friday, December 17-18 | ACNW 49th Meeting (P) | Bethesda, MD | A. Gil |
| G. <u>State and Public Interactions</u> | | | |
| Monday, September 28 | QA Audit Kickoff | Las Vegas, NV | C. Gertz |
| Monday, September 28 | Rotary Club of Las Vegas | Las Vegas, NV | C. Gertz |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|---|---|---------------------|---------------------|
| G. State and Public Interactions (Continued) | | | |
| Tuesday, September 29 | American Institute of Professional Geologists (AIPG) | Lake Tahoe, NV | J. Younker |
| Tuesday, September 29 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | P. Buck |
| Wednesday, September 30 | Kiwanis of Southwest Las Vegas | Las Vegas, NV | D. Van Natta |
| Wednesday, October 7 | North American Tunneling Conference | Boston, MA | C. Gertz |
| Thursday, October 8 | Massachusetts Institute of Technology | Cambridge, MA | C. Gertz |
| Thursday, October 8 | Mobile Home Owners' Association | Las Vegas, NV | TBD |
| Saturday, October 10 | Girl Scouts of America | Calico Basin, NV | R. Arnold |
| Wednesday, October 14 | Kiwanis Club of Las Vegas | Las Vegas, NV | A. Robison |
| Wednesday, October 14 | American Society of Civil Engineers & National Society of Professional Engineers | Las Vegas, NV | C. Gertz |
| Wednesday, October 14 | Fong Elementary School | Las Vegas, NV | E. Harle |
| Thursday, October 15 | Fong Elementary School | Las Vegas, NV | R. Arnold |
| Thursday, October 15 | United Kingdom Pretour Briefing | Las Vegas, NV | C. Gertz |
| Friday, October 16 | Meadows School | Las Vegas, NV | J. Blink |
| Tuesday, October 20 | American Nuclear Society (ANS) | Las Vegas, NV | C. Gertz |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|---|--------------------|---------------------|
| G. <u>State and Public Interactions (Continued)</u> | | | |
| Wednesday, October 21 | ACNW | Las Vegas, NV | C. Gertz |
| Wednesday, October 21 | American Institute of Hydrology | Portland, OR | J. Younker |
| Thursday, October 22 | LV Chamber of Commerce | Las Vegas, NV | C. Gertz |
| Tuesday, October 27 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | B. Crowe |
| Thursday, October 29 | Yucca Mountain Lecture Series (P) | Pahrump, NV | B. Crowe |
| Thursday, October 29 | Mendoza Elementary School | Las Vegas, NV | R. Arnold |
| Friday, October 30 | Colorado School of Mines | Golden, CO | C. Gertz |
| Friday, October 30 | KNFB-Channel 5 Panel Discussion | Reno, NV | C. Gertz |
| Thursday, November 5 | University of Waterloo, Department of Earth Sciences | Ontario, Canada | D. Tepper |
| Tuesday, November 10 | Cornell University, Department of Geological Sciences | Ithaca, NY | D. Tepper |
| Tuesday, November 17 | Yucca Mountain Lecture Series (P) | Beatty, NV | R. Saunders |
| Wednesday, November 18 | American Association of University Women | Las Vegas, NV | M. Powell |
| Thursday, November 19 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | R. Saunders |
| Thursday, November 19 | Archael Nevada | Las Vegas, NV | R. Arnold |

| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|--|---|------------------------|
| H. Exhibits Scheduled | | |
| Saturday, September 26 | Public Open House (P) | Las Vegas, NV |
| Sunday- Wednesday, September 27-30 | AIPG | Lake Tahoe, NV |
| Friday- Sunday, October 2-11 | Jaycees State Fair | Las Vegas, NV |
| Monday- Friday, October 5-9 | Association of Engineering Geologists | Long Beach, CA |
| Thursday- Saturday, October 8-10 | Nevada Library Association | Las Vegas, NV |
| Saturday, October 17 | Public Open House (P) | Las Vegas, NV |
| Sunday- Thursday, October 18-22 | American Mining Congress | Las Vegas, NV |
| Friday- Sunday, October 23-25 | Fairshow '92 | North Las Vegas, NV |
| Monday- Thursday, October 26-29 | Geological Society of America | Cincinnati, OH |
| Monday, November 9 | Public Update Meeting (P) | Amargosa Valley, NV |
| Tuesday, November 10 | Public Update Meeting (P) | Las Vegas, NV |
| Thursday, November 12 | Public Update Meeting (P) | Reno, NV |

| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|--|---|-----------------|
| H. Exhibits Scheduled (Continued) | | |
| Tuesday- Thursday, November 17-19 | ANS Winter Meeting | Chicago, IL |
| Thursday- Saturday, November 19-21 | Nevada Association of Counties | Fallon, NV |
| I. Tours Scheduled | | |
| Saturday, September 26 | Public Open House (P) | Various Escorts |
| Tuesday, October 6 | United States Council for Energy Awareness | TBD |
| Thursday, October 8 | Realtor Association (Las Vegas Board of Realtors) | D. Van Natta |
| Tuesday, October 13 | Senior Tripsters | TBD |
| Thursday, October 15 | Boulder City Senior Center | TBD |
| Thursday, October 15 (Tentative) | US/UK Defense Coordination Meeting | TBD |
| Friday, October 16 | NWTRB | A. Simmons |
| Saturday, October 17 | Public Open House (P) | Various Escorts |
| Tuesday, October 20 | Tonopah High School | TBD |
| Thursday, October 22 | ACNW | TBD |
| Tuesday, October 27 | Quail Estates West | TBD |
| Wednesday, October 28 | Southern NV Retired Teachers' Association | TBD |

| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|--|-------------------------------------|-----------------|
| I. <u>Tours Scheduled (Continued)</u> | | |
| Tuesday, November 3 | Thurman White Middle School | TBD |
| Thursday, November 5 | Thurman White Middle School | TBD |
| Tuesday, November 10 | Thurman White Middle School | TBD |
| Thursday, November 12 | Thurman White Middle School | TBD |
| Friday, November 13 | Boy Scouts of America | M. Penovich |
| Wednesday, November 18 | Public Open House (P) | Various Escorts |
| Thursday, November 19 | Pahrump Middle School | TBD |
| Monday, November 23 | Palo Verde Nuclear Power Station | TBD |
| Tuesday, December 1 | Paradise Christian Academy | TBD |
| Wednesday, December 2 | Pahrump Middle School | TBD |
| Saturday, December 12 | Public Open House (P) | Various Escorts |
| Thursday, March 11, 1993 | Meadows School | TBD |

YMP:VFI-5799

Maxwell E. Gertz
 Carl P. Gertz
 Project Manager



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

WBS 1.2.9.2
QA: N/A

SEP 28 1992

John W. Bartlett, Director, Civilian Radioactive Waste Management,
HQ (RW-1) FORS

OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE WEEK ENDING
SEPTEMBER 18, 1992

I. CRITICAL ITEM STATUS - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
(YMP)

A. Site Characterization Planning

Field Operations

The Site Manager and Field Operations Center staff participated in and provided logistical support for three tours.

The LM-300 drill rig is back in operation as of September 15, 1992. Three hours after the drill rig was put back in operation, the UZ-16 borehole was cored down 19.84 feet. The borehole was cored to a total depth of 679.24 feet and reamed to 659 feet.

Regarding Job Package (JP) 92-7, Fran Ridge Pit Mapping, Reynolds Electrical & Engineering Co., Inc., has deepened the north test pit and is cleaning the bedrock with compressed air and water.

On JP 92-12, Quaternary Faulting, the trench excavation was completed for Trenches SCR-2 and SCR-3 off of Stagecoach Road.

The Site Manager signed and approved the final design drawings for the Hazardous Waste Project Accumulation Area in Area 25.

Sample Management Facility

Processing of core from UE25 UZ-16 continued. Core and cuttings from USW UZN-31 were recovered and processing continued.

Site Investigations

Soil and rock properties investigations for the Exploratory Studies Facility (ESF) resumed this week with the excavation of test pits for density testing of foundation materials.

Clearing began of a pavement for fracture mapping in the Topopah Spring member of the Paintbrush Tuff near the Fran Ridge Test pit.

As of September 16, 1992, coring of USW UZN-31 had progressed to a depth of 94.5 feet. The drill bit broke off during subsequent reaming at a depth of 79 feet. The broken bit was successfully retrieved with only a few hours down time and drilling is expected to resume on September 17, 1992.

Technical Analysis

Jeremy Boak (Yucca Mountain Site Characterization Project Office [YMPO]) and Abe Van Luik (Civilian Radioactive Waste Management System Management and Operating Contractor [CRWMS M&O]) attended the eighth meeting of the Performance Assessment Advisory Group of the Organization for Economic Cooperation and Development in Paris, France. The purpose of the meeting was to review developments in performance assessment in member countries. Jeremy Boak presented a paper on hypothesis testing.

Several staff members toured the University of Nevada, Las Vegas (UNLV) facilities participating in YMPO studies. Participation in the studies is sponsored by the UNLV School of Engineering.

Regulatory Interactions

Mined Geologic Disposal System (MGDS) Annotated Outline (AO)

Comment consolidation for review of Revision 1 of the MGDS AO was completed on September 11, 1992. The authors are currently reworking the document in preparation for the September 1992, Revision 1, submittal to the U.S. Nuclear Regulatory Commission (NRC).

Issue Resolution

Members of the Volcanism Working Group participated in the Nuclear Waste Technical Review Board (NWTRB) Working Group meeting on volcanism. Presentations by the U.S. Geological Survey, Los Alamos National Laboratory (Los Alamos), NRC, and the State of Nevada were helpful in clarifying volcanism-related issues. A field trip to excavations in the Crater Flat area was conducted to view the deposits under discussion.

ESF Task Force Activities

Regarding the Independent Technical Review of the 90 percent complete ESF Design Package 1A, the verification process is continuing with some unresolved comments.

Site Characterization Plan (SCP) Study Plan (SP) Status

One new SP revision was submitted to YMPO this week:
 SP 8.3.1.17.3.4 R1, "Effect of Local Site Geology on Surface and
 Subsurface Motion." SP 8.3.1.5.1.3, "Climatic Implications of
 Terrestrial Paleoecology," completed the NRC Phase 1 Review.

STUDY PLAN BREAKDOWN

| | |
|--|----|
| In Screening Review | 0 |
| In YMPO and U.S. Department of Energy (DOE)/ Headquarters (HQ) Review | 2 |
| Awaiting Comment Resolution | 12 |
| Awaiting Author Revision | 5 |
| In YMPO/HQ Verification Audit | 4 |
| Preparing to Submit or Awaiting YMPO Approval | 5 |
| Awaiting Submission to the NRC | 0 |
| NRC Phase 1 Review | 16 |
| NRC Acceptance | 28 |
| Total | 72 |

SCP/SP Status:

| | |
|---|-----|
| Total SPs Assigned to Cover 106 Studies | 103 |
| SPs Not Yet Submitted for Review | 38 |
| SPs Submitted for Initial Review | 65 |
| Revised SPs Submitted for Review | 7 |
| Total SPs Submitted for Review | 72 |

State of Nevada Comments Status:

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| Received Comments from the State of Nevada | 10 |
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NRC Comments Status:

| | |
|--|----|
| Received Comments from NRC | 18 |
| Responses Transmitted from OGD to DOE/HQ | 11 |

B. Project Planning and Control

Participant August 1992 status was merged into the Long-Range
 Plan/Integrated Project Schedule.

The August 1992 status and Cost Performance Reports (CPR) were
 produced and distributed to the participants.

The project-level data base was rolled and project CPR and status reports were produced for Project Manager Carl Gertz, Division Directors, and project work breakdown structure (WBS) element managers.

Variance Analysis Reports of the August 1992 status data were prepared at the third level WBS for Division Directors and project WBS Element Managers. Variance analyses at the fifth level WBS (by participant) were prepared to support the upcoming Performance Management meeting on September 25, 1992.

The Project Summary Schedule was submitted to YMPO.

C. Quality Assurance (QA) Implementation

Determination of Importance and Grading Enhancement

Quality (Q) List and Q-List Procedure Development

Sandia National Laboratories (SNL) reported that there will be a delay in delivery of the Items Important to Waste Isolation and Items Important to Safety reports. New delivery dates are being determined. The draft Implementing Line Procedure (ILP) 1.3/Office of the Project Manager, which contains the YMPO selection and application of controls procedure, was issued for QA Procedure 6.2 review. Comments were received on September 17, 1992.

Management Control (MC) List and Procedure Development

Discussions with YMPO regarding the contents, concepts, and processes contained in the MC List Plan continue. The Requirements Traceability Network (RTN) User's Manual was submitted for internal Technical and Management Support Services review on September 18, 1992.

Implementation

Resolution of comments on the two draft ILPs relative to Assessment Team (AT) conduct of business and development/maintenance of the AT Controlled List was completed on September 18, 1992. The AT is resolving operational issues and continues working with the initial classification submittal from Raytheon Services Nevada (RSN) on the ESF design package.

The interface specification between the RTN and Automated Requirements Management System was issued.

D. Public Outreach and Institutional Activities

Institutional and External Affairs (IEA) staff coordinated logistics for the transportation container to be located at the Las Vegas Yucca Mountain Information Office (YMIO) September 12-13, 1992. On September 12, 1992, radio station KFM-102 broadcast live from the YMIO as part of the advertising campaign for the transportation container exhibit. During the broadcast, over 300 people stopped to view the container. Approximately 80 people viewed the container on September 13, 1992. On both days, most of the visitors also toured the YMIO, received literature, and signed up for tours to Yucca Mountain, Nevada.

Richard Arnold (a consultant) gave a cultural resources presentation to members of the Daughters of the American Revolution on September 14, 1992, in Las Vegas, Nevada. Richard Arnold also gave a presentation to the seventh grade class of St. Viator's School in Las Vegas on September 16, 1992.

Carl Gertz provided a technical presentation to members and guests of the American Nuclear Society in Richmond, Virginia, on September 15, 1992. Approximately 50 people attended.

Kathleen Grassmeier (YMPO) gave a transportation presentation to the Air and Waste Management Association at the Desert Research Institute in Las Vegas on September 16, 1992. IEA staffed the transportation container exhibit at the event.

A tour to Yucca Mountain was conducted on September 16, 1992, for 56 guests of the NWTB, and September 17-18, 1992, for 45 guests of the NRC.

IEA staff coordinated logistics for the transportation container to be on exhibit at the Teamsters Local 631 in Las Vegas on September 16, 1992. The container was also on exhibit at the Pahrump Harvest Festival in Pahrump, Nevada, September 18-19, 1992.

CRWMS M&O staff attended the first formal meeting of the Nye County Procurement Working Group in Las Vegas on September 9, 1992. They also met with Nevada State Senator Tom Hickey in Las Vegas on September 10, 1992, to discuss a proposal for a working group hosted by UNLV on math/science education restructuring and other interactions with Nevada educational institutions.

A. C. Robison (YMPO) provided a general overview presentation to members of the Las Vegas Association of Realtors on September 18, 1992, in Las Vegas.

II. ANALYSIS & VERIFICATION DIVISION

On September 17, 1992, the staff participated in a senior management meeting to discuss issues related to the Convergence Plan in Arlington, Virginia. They also participated in the Geochemistry Integration Team (GIT) quarterly meeting in Las Vegas. The meeting included preparations for a GIT-sponsored workshop regarding Thermal Loading Effects on Geochemical Properties. It is anticipated that the workshop will be held in December 1992.

The staff attended the NWTRE SG&G Panel Meeting on Volcanism and participated in the NWTRE/DOE field trip on volcanic features relevant to the Yucca Mountain site September 14-16, 1992, in Las Vegas.

The staff participated in the NRC Technical Exchange September 17-18, 1992, on Midway Valley Trenching (SP 8.3.1.17.4.2, "Location and Recency of Faulting Near Prospective Surface Facilities") and Yucca Mountain tour of Midway Valley in Las Vegas.

III. GENERAL INFORMATION ITEMS

CRWMS M&O

The final report for Mission 2001 was issued on September 18, 1992.

A Readiness briefing was prepared and a Readiness Review is being conducted for the Repository Advanced Conceptual Design (ACD). A Readiness Review is also being conducted for the Waste Package ACD and the transition of ESF Title II Design.

Lawrence Livermore National Laboratory

A revised algorithm for checking compliance with NRC radionuclide release rate limits was implemented and tested. This algorithm implements the 10 CFR 60 peak annual release limits.

Thermal-hydrological calculations have been conducted for comparison with prior calculations using LLNL-Engineering and SNL codes. For comparison purposes, these calculations apply the thermal conductivity value of the welded Topopah Springs unit to the entire unsaturated zone. Since this value is much larger than the value of adjacent far-field units, their insulating value is less in these simplified calculations and the duration of boiling is reduced about 50 percent from the more realistic calculations. Comparison with the similar calculations at SNL and LLNL-Engineering indicate that the three codes agree within about ten percent for both peak temperature and duration of boiling. These calculations also indicate that, for long term boiling performance, the depth of the repository appears to be optimal, with the highest thermal conductivity in the near-field (limiting peak temperatures) and lower thermal conductivity in the far-field (insulating the repository).

RSN

Two topographic sketches for UZ-14 were completed and submitted to YMPO.

Regarding the NRG-6 drill pad and access road, design was completed and the design products were submitted.

Work is progressing on the modification of north pad high wall and starter tunnel drawings.

LOS ALAMOS

The report, "Proceedings of the DOE/Yucca Mountain Site Characterization Project Radionuclide Adsorption Workshop at Los Alamos National Laboratory, September 11-12, 1990," was published and distributed. This document, which was compiled by Julie Canepa, Technical Project Officer for Los Alamos, includes invited papers and abstracts by twelve scientists.

YMP

Readiness Reviews are being conducted in the areas of Waste Package and Repository. They are also being conducted on the start of ESF construction.

Review of the Engineering Plan for WBS 1.2.3 (Surface-Based Testing) continued.

IV. UPCOMING EVENTS CALENDAR

Please note that the usage of "(P)" in the calendar indicates that the event is open to the public. Educational presentations and State and Public Interactions are handled by the Speakers Bureau; contact Theresa Hirsch at (702) 794-7759 for additional information. Exhibits are handled by Kevin Rohrer at (702) 794-7769, and tours are handled by Carleen Hill at (702) 794-7375.

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|-------------|--------------|-----------------|---------------------|
|-------------|--------------|-----------------|---------------------|

A. DOE/HQ Meetings

No significant new meetings this week.

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|---|--|--------------------|---------------------|
| B. <u>CRWMS M&O/DOE Meetings</u> | | | |
| Wednesday, September 23 | Program Management Review | Las Vegas, NV | C. Gertz |
| Friday, September 25 | Performance Management | Las Vegas, NV | C. Gertz |
| C. <u>Internal and DOE/NV Meetings</u> | | | |
| Thursday, September 24 | ESAAB Dry Run | Las Vegas, NV | C. Gertz |
| Wednesday, October 21 | DOE/NV Monthly Program Review | Las Vegas, NV | C. Gertz |
| D. <u>NRC Interactions</u> | | | |
| Friday, October 30 (Tentative) | Technical Exchange - Functional Analysis of 10 CFR 60 (P) | San Antonio, TX | T. Bjerstedt |
| Tuesday, November 17 | Technical Exchange - Volcanism (P) | Albuquerque, NM | T. Bjerstedt |
| TBD | Interaction Planning Meeting (P) | Rockville, MD | T. Bjerstedt |
| Monday- Tuesday, December 14-15 | Technical Exchange - Total System Perform- ance Assessment (P) | Rockville, MD | T. Bjerstedt |
| E. <u>NWTRB Interactions</u> | | | |
| Wednesday- Thursday, September 30- October 1 | NWTRB Dry Run | Las Vegas, NV | J. Cooper |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMFO Contact</u> |
|--|---------------------------------------|--------------------|---------------------|
| E. <u>NWTRB Interactions</u> (Continued) | | | |
| Wednesday- Thursday, October 14-15 | NWTRB Full Board Meeting (P) | Las Vegas, NV | J. Cooper |
| Friday, October 16 | NWTRB Yucca Mountain Site Tour (P) | Las Vegas, NV | J. Cooper |
| Wednesday- Friday, November 4-6 (Tentative) | NWTRB SG&G Panel Meeting (P) | Denver, CO | J. Cooper |
| Wednesday- Friday, November 18-20 | Workshop on Expert Judgment (P) | Albuquerque, NM | A. Simmons |
| Tuesday- Wednesday, January 5-6, 1993 | NWTRB Full Board Meeting (P) | Arlington, VA | J. Cooper |
| February or March 1993 TBD | NWTRB HG&G Panel Meeting (P) | TBD | J. Cooper |
| Tuesday- Friday, April 20-23, 1993 | NWTRB Full Board Meeting (P) | Reno, NV | J. Cooper |
| Tuesday, June 1, 1993 | NWTRB International Trip | TBD | J. Cooper |
| Monday- Thursday, July 12-15, 1993 | NWTRB Full Board Meeting (P) | Denver, CO | J. Cooper |
| Tuesday- Friday, October 19-22, 1993 | NWTRB Full Board Meeting (P) | Las Vegas, NV | J. Cooper |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|--|------------------|---------------------|
| F. <u>Advisory Committee on Nuclear Waste (ACNW) Interactions</u> | | | |
| Wednesday- Friday, September 23-25 | ACNW 46th Meeting | Bethesda, MD | A. Gil |
| Tuesday, October 20 | ACNW WG on Human Intrusion (P) | Las Vegas, NV | A. Gil |
| Wednesday, October 21 | ACNW 47th Meeting | Las Vegas, NV | A. Gil |
| Thursday, October 22 | ACNW Yucca Mountain and NTS Tours | Las Vegas, NV | A. Gil |
| Friday, October 23 | ACNW GIS Tour | Las Vegas, NV | A. Gil |
| Monday- Tuesday, November 16-17 | ACNW 48th Meeting | Bethesda, MD | A. Gil |
| Wednesday, November 18 | ACNW WG Climate (P) | Bethesda, MD | A. Gil |
| Wednesday, December 16 | ACNW WG on PA -- Phase 2 HLW Interactive PA by NRC (P) | Bethesda, MD | A. Gil |
| Thursday- Friday, December 17-18 | ACNW 49th Meeting | Bethesda, MD | A. Gil |
| G. <u>State and Public Interactions</u> | | | |
| Monday, September 21 | Emerging Technologies for Hazardous Waste Management | Atlanta, GA | C. Gertz |
| Thursday, September 24 | Yucca Mountain Lecture Series (P) | Beatty, NV | P. Buck |
| Thursday, September 24 | Nuclear Association of Regulatory Utility Commissioners (NARUC) Tour Briefing | Las Vegas, NV | C. Gertz |

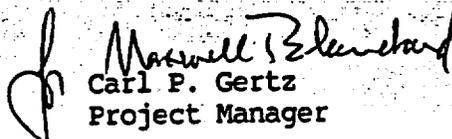
| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|---|---------------------|---------------------|
| G. <u>State and Public Interactions</u> (Continued) | | | |
| Friday, September 25 | Western Universities Research | Las Vegas, NV | C. Gertz |
| Monday, September 28 | QA Audit Kickoff | Las Vegas, NV | C. Gertz |
| Monday, September 28 | Rotary Club of Las Vegas | Las Vegas, NV | C. Gertz |
| Tuesday, September 29 | American Institute of Professional Geologists (AIPG) | Lake Tahoe, NV | J. Younker |
| Tuesday, September 29 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | P. Buck |
| Tuesday, September 29 | Kiwanis of Southwest Las Vegas | Las Vegas, NV | D. Van Natta |
| Wednesday, October 7 | North American Tunneling Conference | Boston, MA | C. Gertz |
| Thursday, October 8 | Massachusetts Institute of Technology | Cambridge, MA | C. Gertz |
| Saturday, October 10 | Girl Scouts of America | Calico Basin, NV | R. Arnold |
| Wednesday, October 14 | Kiwanis Club of Las Vegas | Las Vegas, NV | A. Robison |
| Wednesday, October 14 | American Society of Civil Engineers & National Society of Professional Engineers | Las Vegas, NV | C. Gertz |
| Thursday, October 15 | United Kingdom Pretour Briefing | Las Vegas, NV | C. Gertz |
| Friday, October 16 | Meadows School | Las Vegas, NV | J. Blink |
| Tuesday, October 20 | American Nuclear Society | Las Vegas, NV | C. Gertz |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|---|--------------------|---------------------|
| G. <u>State and Public Interactions</u> (Continued) | | | |
| Wednesday, October 21 | ACNW | Las Vegas, NV | C. Gertz |
| Wednesday, October 21 | American Institute of Hydrology | Portland, OR | J. Younker |
| Thursday, October 22 | LV Chamber of Commerce | Las Vegas, NV | C. Gertz |
| Tuesday, October 27 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | B. Crowe |
| Thursday, October 29 | Yucca Mountain Lecture Series (P) | Pahrump, NV | B. Crowe |
| Thursday, October 29 | Mendoza Elementary School | Las Vegas, NV | R. Arnold |
| Friday, October 30 | Colorado School of Mines | Golden, CO | C. Gertz |
| Friday, October 30 | KNPB-Channel 5 Panel Discussion | Reno, NV | C. Gertz |
| Thursday, November 5 | University of Waterloo, Department of Earth Sciences | Ontario, Canada | D. Tepper |
| Tuesday, November 10 | Cornell University, Department of Geological Sciences | Ithaca, NY | D. Tepper |
| Tuesday, November 17 | Yucca Mountain Lecture Series (P) | Beatty, NV | R. Saunders |
| Wednesday, November 18 | American Association of University Women | Las Vegas, NV | M. Powell |
| Thursday, November 19 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | R. Saunders |
| Thursday, November 19 | Archael Nevada | Las Vegas, NV | R. Arnold |

| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|--|---|------------------------|
| H. Exhibits Scheduled | | |
| Friday- Sunday, September 18-20 | Home Show | Las Vegas, NV |
| Friday- Sunday, September 18-20 | Pahrump Harvest Festival | Pahrump, NV |
| Saturday- Sunday, September 19-20 | LLNL 40th Anniversary Family Open House | Livermore, CA |
| Saturday, September 26 | Public Open House (P) | Las Vegas, NV |
| Sunday- Wednesday, September 27-30 | AIPG | Lake Tahoe, NV |
| Friday- Sunday, October 2-11 | Jaycees State Fair | Las Vegas, NV |
| Monday- Friday, October 5-9 | Association of Engineering Geologists | Long Beach, CA |
| Thursday- Saturday, October 8-10 | Nevada Library Association | Las Vegas, NV |
| Saturday, October 17 | Public Open House (P) | Las Vegas, NV |
| Sunday- Thursday, October 18-22 | American Mining Congress | Las Vegas, NV |
| Friday- Sunday, October 23-25 | Fairshow '92 | North Las Vegas, NV |
| Monday- Thursday, October 26-29 | Geological Society of America | Cincinnati, OH |

| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|---|---|--------------------------------------|
| H. <u>Exhibits Scheduled</u> (Continued) | | |
| Monday, November 9 | Public Update Meeting (P) | Amargosa, NV |
| Tuesday, November 10 | Public Update Meeting (P) | Las Vegas, NV |
| Thursday, November 12 | Public Update Meeting (P) | Reno, NV |
| Tuesday- Thursday, November 17-19 | American Nuclear Society Winter Meeting | Chicago, IL |
| Thursday- Saturday, November 19-21 | Nevada Association of Counties | Fallon, NV |
| <u>Date</u> | <u>Event</u> | <u>Escorts</u> |
| I. <u>Tours Scheduled</u> | | |
| Tuesday, September 22 | CRWMS M&O Program Management Review | D. Foust D. Van Natta T. Kaish |
| Wednesday, September 23 | Beatty Chamber of Commerce | S. Tarr |
| Friday, September 25 | NARUC | A. Robison, T. Bjerstedt |
| Saturday, September 26 | Public Open House (P) | Various Escorts |
| Tuesday, October 6 | United States Council for Energy Awareness | TBD |
| Thursday, October 8 | Realtor Association (Las Vegas Board of Realtors) | D. Van Natta |
| Tuesday, October 13 | Senior Tripsters | TBD |
| Thursday, October 15 | Boulder City Senior Center | TBD |

| <u>Date</u> | <u>Event</u> | <u>Escorts</u> |
|--|--|-----------------|
| I. <u>Tours Scheduled</u> (Continued) | | |
| Thursday, October 15 (Tentative) | US/UK Defense Coordination Meeting | TBD |
| Friday, October 16 | NWTRB | A. Simmons |
| Saturday, October 17 | Public Open House (P) | Various Escorts |
| Tuesday, October 20 | Tonopah High School | TBD |
| Thursday, October 22 | ACNW | TBD |
| Tuesday, October 27 | Quail Estates West | TBD |
| Wednesday, October 28 | Southern NV Retired Teachers' Association | TBD |
| Tuesday, November 3 | Thurman White Middle School | TBD |
| Thursday, November 5 | Thurman White Middle School | TBD |
| Tuesday, November 10 | Thurman White Middle School | TBD |
| Thursday, November 12 | Thurman White Middle School | TBD |
| Friday, November 13 | Boy Scouts | M. Penovich |
| Wednesday, November 18 | Public Open House (P) | Various Escorts |
| Saturday, December 12 | Public Open House (P) | Various Escorts |
| Thursday, March 11, 1993 | Meadows School | TBD |


 Maxwell B. Blumhard
 Carl P. Gertz
 Project Manager



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

WBS 1.2.9.2
QA: N/A

SEP 24 1992

John W. Bartlett, Director, Civilian Radioactive Waste Management,
HQ (RW-1) FORS

OFFICE OF GEOLOGIC DISPOSAL (OGD) WEEKLY HIGHLIGHTS FOR THE WEEK ENDING
SEPTEMBER 11, 1992

I. CRITICAL ITEM STATUS - YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
(YMP)

A. Site Characterization Planning

Field Operations

The Site Manager and Field Operations Center staff participated in and provided logistical support for one major tour this reporting period.

The LM-300 drill rig transmission was replaced but the new transmission is defective. Drilling activities on UZ-16 are expected to be resumed on September 14, 1992. UZ-16 is currently cored to a depth of 673 feet and reamed to 639 feet.

Drilling activities with the CME-850 drill rig continue on neutron access borehole USW UZN-31 which is currently at a depth of 28 feet and is cased to 21 feet. The completed depth of the hole will be 180 feet.

On September 8, 1992, Reynolds Electrical & Engineering Co., Inc. (REECo), moved the CME-550 drill rig to Exile Hill to complete borehole NRG-1 to a depth of 142 feet.

Excavation activities (Job Package [JP] 92-7) continue at Fran Ridge. REECo completed drilling holes for the second blast which occurred on September 4, 1992.

REECo completed construction of the access road in preparation for the site preparation for the N-35 borehole (JP 91-9).

On JP 92-2, NRG Soil and Rock Properties, REECo is continuing the exposure of the NRG-1 pavement study area.

On JP 92-12, Quaternary Faulting, excavation continues on Trench SCR-1 which is located in the vicinity of Stage Coach Road.

The Site Manager and support staff will be providing operational and logistical support to special emphasis groups next week, including the U.S. Nuclear Regulatory Commission (NRC) and Nuclear Waste Technical Review Board (NWTIRB). They are also finalizing security and support for the upcoming public open house and site tour scheduled for September 26, 1992; seven busloads of participants are anticipated.

Sample Management Facility

The Sample Overview Committee meeting, which was held on September 10, 1992, was supported. Processing of core and cuttings from USW UZN-31 continued. The core party for UE25 UZ-16 was completed; core examination was from 30.3 feet to 541.9 feet. Support of activities at UZ-16 continued.

Trenching at the Lathrop Wells Volcanic Center (TFP 91-32)

REECo began construction of a large trench at the Lathrop Wells Volcanic Center on September 8, 1992. The purpose of this trench, which will remain open for approximately one year, is to expose a buried lava flow, pyroclastic units and, possibly, a soil. The exposures will be studied to help further define the geochronology of the Lathrop Wells Volcanic Center.

Exploratory Studies Facility (ESF) Task Force Activities

Regarding the Independent Technical Review of the 90 percent complete ESF Design Package 1A, the verification process is continuing with some unresolved comments. A readiness review for construction management is scheduled to begin September 14, 1992.

Site Characterization Plan (SCP) Study Plan (SP) Status

No new SPs were approved by the Yucca Mountain Site Characterization Project Office (YMPO) this week.

STUDY PLAN BREAKDOWN

| | |
|--|----|
| In Screening Review | 0 |
| In YMPO and U.S. Department of Energy (DOE)/ Headquarters (HQ) Review | 1 |
| Awaiting Comment Resolution | 12 |
| Awaiting Author Revision | 5 |
| In YMPO/HQ Verification Audit | 4 |
| Preparing to Submit or Awaiting YMPO Approval | 5 |
| Awaiting Submission to the NRC | 0 |
| NRC Phase 1 Review | 17 |
| NRC Acceptance | 27 |
| Total | 71 |

SCP/SP Status:

| | |
|---|-----|
| Total SPs Assigned to Cover 106 Studies | 103 |
| SPs Not Yet Submitted for Review | 38 |
| SPs Submitted for Initial Review | 65 |
| Revised SPs Submitted for Review | 6 |
| Total SPs Submitted for Review | 71 |

State of Nevada Comments Status:

| | |
|--|----|
| Received Comments from the State of Nevada | 10 |
| Responses Transmitted to the State of Nevada | 8 |

NRC Comments Status:

| | |
|--|----|
| Received Comments from NRC | 14 |
| Responses Transmitted from OGD to DOE/HQ | 9 |

B. Project Planning and Control

Participant Planning and Control System (PACS) cost/schedule status data for August 1992 was received. The status was uploaded from the participant workstations to PACS. The new data was calculated through the PACS rollup on all participant data bases. The participant data was combined in the central PACS project-level data base.

Updates to the Mission 2001 planning data were received from the participants and the data was uploaded to the PACS participant data bases.

C. Quality Assurance Implementation**Determination of Importance and Grading Enhancement****Quality (Q) List and Q-List Procedure Development**

Sandia National Laboratories (SNL) indicates that they will provide the Assessment Team (AT) with the Items Important to Waste Isolation report on September 10, 1992, and the Items Important to Safety report on September 21, 1992, at which time a YMPO policy review will begin.

Management Control (MC) List and Procedure Development

Discussions with YMPO regarding the contents, concepts, and processes contained in the MC List Plan continue. Transmittal of the plan to YMPO has been delayed until the week of September 14, 1992, to allow for determination of a referenceable number for the document and completion of the transmittal letter.

Implementation

Review comments on the interface specification between Requirements Traceability Network and the Automated Requirements Management System have been resolved.

D. Public Outreach and Institutional Activities

The Institutional and External Affairs (IEA) staff coordinated and accompanied three Nye County, Nevada, officials on a tour of Yucca Mountain, Nevada, on September 8, 1992. A tour to Yucca Mountain was also conducted on September 9, 1992, for ten employees of the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O). The employees were given a general orientation to the project.

The IEA staff handled logistics and staffed the transportation container exhibit at the Meadows Mall in Las Vegas, Nevada, September 5-6, 1992, and at the Nevada Nuclear Waste Study Committee rally at Cashman Field in Las Vegas, on September 9, 1992. Over 200 people stopped to view the container at the Meadows Mall and many of them toured the Las Vegas Yucca Mountain Information Office.

The staff coordinated and attended the Nye County/DOE Procurement Working Group meeting on September 9, 1992, in Las Vegas. They also attended the State/Local Government Planning Group meeting in Bishop, California, on September 10, 1992.

The IEA staff met with REECO Print Plant personnel to orient them to current and upcoming printing requests. Four new fact sheets were submitted to the REECO Print Plant for printing: "Cultural Resources Program: Preservation through Cooperation," "Studying the Movement of Rocks and Earthquakes," "Nevadans' Average Annual Exposure to Radiation," and "What is Nuclear Fuel and Nuclear Waste?". All fact sheets are part of the new "Nevada Approach" product line and will be printed on recycled paper.

The IEA staff assisted in the preparation of a presentation, "Issues in Regional Regulation," which was presented by A. C. Robison (YMPO) at the National Association of Regulatory Utilities Commissioners (NARUC) conference on September 10, 1992, in Columbus, Ohio. A final paper to be published in the NARUC conference proceedings is in production.

Carl Gertz, Project Manager, gave a general update presentation at the Technical Project Officers meeting on September 11, 1992, in Las Vegas. A. C. Robison also gave a presentation at the Planning and Budget Meeting concerning Nye County protocols and YMP staff participation in outreach programs.

II. ANALYSIS & VERIFICATION DIVISION

A briefing was provided to FW-2 on September 9, 1992, in Washington, D.C., regarding convergence plan activities related to the upcoming September 17, 1992, senior management meeting.

The staff attended the High-Level Waste/Carbon-14 Release subcommittee meeting of the U.S. Environmental Protection Agency Science Advisory Board's Radiation Advisory Committee September 9-10, 1992, in Washington, D.C. The meeting included the final review by the subcommittee of the issues relating to the gaseous release of Carbon-14 from high-level radioactive waste disposal.

The technical review was completed under Administrative Procedure (AP) 1.10Q for SP 8.3.1.17.4.4, "Quaternary Strike-Slip Faulting Proximal to the Site Within Northeast-Trending Fault Zones."

The verification review was initiated under AP 1.10Q for SP 8.3.1.2.3.3, "Site Saturated Zone Synthesis and Modeling"

III. GENERAL INFORMATION ITEMS

CRWMS M&O

Preparations continue for the ESF Design Team's Readiness Review which will be held September 16-17, 1992.

A Technical Data Management meeting was held with all participants on September 9, 1992. The status of the Technical Data Base (TDB) and the procedures for inputting and accessing data was discussed.

The TDB Transition Plan was submitted to the Technical Project Officers from SNL, Technical and Management Support Services, and CRWMS M&O for final signature approval. When approvals are received, they will be submitted to YMPO for signature.

Lawrence Livermore National Laboratory (LLNL)

A linear ramp-down to zero power in the one-year period following four years of full power heater testing has been modeled for both the reference and high-permeability cases. Although the heaters were turned off after five years, boiling conditions at the center of the heater array persisted until 6.5 years for the reference case and 5.8 years for the high-permeability case. Rewetting of the heater horizon back to one-half ambient saturation at the center of the heater array takes much longer than cooling to subboiling temperatures (533 years for the reference case and 621 years for the high-permeability case). The longer rewetting time is due to the enhanced vertical movement of gas carrying away moisture from the condensate zone above the dry-out zone. Hence, "breathing" of the UZ is facilitated by a large permeability. Both cases require nearly 5,000 years to rewet back to ambient saturation. Interestingly, the high-permeability case promotes both lower peak near-field temperatures and a longer duration of subambient conditions.

IV. UPCOMING EVENTS CALENDAR

Please note that the usage of "(P)" in the calendar indicates that the event is open to the public. Educational presentations and State and Public Interactions are handled by the Speakers Bureau; contact Theresa Hirsch at (702) 794-7759 for additional information. Exhibits are handled by Kevin Rohrer at (702) 794-7769, and tours are handled by Carleen Hill at (702) 794-7375.

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|-------------|--|-----------------|---------------------|
| A. | <u>DOE/HQ Meetings</u> | | |
| | No significant new meetings this week. | | |
| B. | <u>CRWMS M&O/DOE Meetings</u> | | |
| | No significant new meetings this week. | | |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|---|---|--------------------|---------------------|
| C. <u>Internal and DOE/NV Meetings</u> | | | |
| No significant new meetings this week. | | | |
| D. <u>NRC Interactions</u> | | | |
| Thursday- Friday, September 17-18 | Site Visit: Midway Valley (P) | LV/NTS/YM | T. Bjerstedt |
| Friday, October 30 (Tentative) | Technical Exchange - Functional Analysis of 10 CFR 60 (P) | San Antonio, TX | T. Bjerstedt |
| Tuesday, November 17 | Technical Exchange - Volcanism (P) | Albuquerque, NM | T. Bjerstedt |
| TBD | Interaction Planning Meeting (P) | Rockville, MD | T. Bjerstedt |
| Monday- Tuesday, December 14-15 | Technical Exchange - Total System Performance Assessment (P) | Rockville, MD | T. Bjerstedt |
| E. <u>NWTRB Interactions</u> | | | |
| Monday- Tuesday, September 14-15 | NWTRB SG&G Panel Meeting (P) | Las Vegas, NV | J. Cooper |
| Wednesday, September 16 | NWTRB SG&G Field Trip (P) | TBD | J. Cooper |
| Wednesday- Thursday, September 30- October 1 | NWTRB Dry Run | Las Vegas, NV | J. Cooper |
| Wednesday- Thursday, October 14-15 | NWTRB Full Board Meeting (P) | Las Vegas, NV | J. Cooper |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|---------------------------------------|--------------------|---------------------|
| E. <u>NWIRB Interactions</u> (Continued) | | | |
| Friday, October 16 | NWIRB Yucca Mountain Site Tour (P) | Las Vegas, NV | J. Cooper |
| Wednesday- Friday, November 4-6 (Tentative) | NWIRB SG&G Panel Meeting (P) | Denver, CO | J. Cooper |
| Wednesday- Friday, November 18-20 | Workshop on Expert Judgment (P) | Albuquerque, NM | A. Simmons |
| Tuesday- Wednesday, January 5-6, 1993 | NWIRB Full Board Meeting (P) | Arlington, VA | J. Cooper |
| February or March 1993 TBD | NWIRB HG&G Panel Meeting (P) | TBD | J. Cooper |
| Tuesday- Friday, April 20-23, 1993 | NWIRB Full Board Meeting (P) | Reno, NV | J. Cooper |
| Tuesday, June 1, 1993 | NWIRB International Trip | TBD | J. Cooper |
| Monday- Thursday, July 12-15, 1993 | NWIRB Full Board Meeting (P) | Denver, CO | J. Cooper |
| Tuesday- Friday, October 19-22, 1993 | NWIRB Full Board Meeting (P) | Las Vegas, NV | J. Cooper |

F. State and Public Interactions

| | | | |
|--------------------------|---|------------------|-----------|
| Monday, September 14 | Daughters of the American Revolution | Las Vegas, NV | R. Arnold |
| Tuesday, September 15 | American Nuclear Society | Richmond, VA | C. Gertz |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|---|---------------------|---------------------|
| F. <u>State and Public Interactions</u> (Continued) | | | |
| Wednesday, September 16 | St. Viator's School | Las Vegas, NV | R. Arnold |
| Friday, September 18 | Las Vegas Board of Realtors | Las Vegas, NV | A. Robison |
| Monday, September 21 | Emerging Technologies for Hazardous Waste Management | Atlanta, GA | C. Gertz |
| Thursday, September 24 | Yucca Mountain Lecture Series (P) | Beatty, NV | P. Buck |
| Monday, September 28 | Rotary Club | Las Vegas, NV | C. Gertz |
| Tuesday, September 29 | American Institute of Professional Geologists (AIPG) | Lake Tahoe, NV | J. Younker |
| Tuesday, September 29 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | P. Buck |
| Tuesday, September 29 | Kiwanis of Southwest Las Vegas | Las Vegas, NV | D. Van Natta |
| Wednesday, October 7 | North American Tunneling Conference | Boston, MA | C. Gertz |
| Thursday, October 8 | Massachusetts Institute of Technology | Cambridge, MA | C. Gertz |
| Saturday, October 10 | Girl Scouts of America | Calico Basin, NV | R. Arnold |
| Wednesday, October 14 | American Society of Civil Engineers and National Society of Professional Engineers | Las Vegas, NV | C. Gertz |
| Thursday, October 15 | United Kingdom Pretour Briefing | Las Vegas, NV | C. Gertz |
| Tuesday, October 20 | American Nuclear Society | Las Vegas, NV | C. Gertz |

| <u>Date</u> | <u>Event</u> | <u>Location</u> | <u>YMPO Contact</u> |
|--|---|--------------------|---------------------|
| F. <u>State and Public Interactions</u> (Continued) | | | |
| Thursday, October 22 | LV Chamber of Commerce | Las Vegas, NV | C. Gertz |
| Tuesday, October 27 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | B. Crowe |
| Thursday, October 29 | Yucca Mountain Lecture Series (P) | Pahrump, NV | B. Crowe |
| Friday, October 30 | Colorado School of Mines | Golden, CO | C. Gertz |
| Friday, October 30 | KNPB-Channel 5 Panel Discussion | Reno, NV | C. Gertz |
| Thursday, November 5 | University of Waterloo, Department of Sciences | Ontario, Canada | D. Tepper |
| Tuesday, November 10 | Cornell University, Department of Geological Sciences | Ithaca, NY | D. Tepper |
| Tuesday, November 17 | Yucca Mountain Lecture Series (P) | Beatty, NV | R. Saunders |
| Wednesday, November 18 | American Association of University Women | Las Vegas, NV | M. Powell |
| Thursday, November 19 | Yucca Mountain Lecture Series (P) | Las Vegas, NV | R. Saunders |
| Thursday, November 19 | Archael Nevada | Las Vegas, NV | R. Arnold |

| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|-------------------------------------|--------------|-----------------|
| G. <u>Exhibits Scheduled</u> | | |

| | | |
|---------------------------------------|-----------------------------|------------------|
| Friday- Sunday, September 18-20 | Home Show | Las Vegas, NV |
| Friday- Sunday, September 18-20 | Pahrump Harvest Festival | Pahrump, NV |

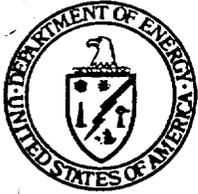
| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|--|---|------------------------|
| G. Exhibits Scheduled (Continued) | | |
| Saturday- Sunday, September 19-20 | LLNL 40th Anniversary Family Open House | Livermore, CA |
| Saturday, September 26 | Public Open House (P) | Las Vegas, NV |
| Sunday- Wednesday, September 27-30 | AIPG | Lake Tahoe, NV |
| Friday- Sunday, October 2-11 | Jaycees State Fair | Las Vegas, NV |
| Monday- Friday, October 5-9 | Association of Engineering Geologists | Long Beach, CA |
| Thursday- Saturday, October 8-10 | Nevada Library Association | Las Vegas, NV |
| Saturday, October 17 | Public Open House (P) | Las Vegas, NV |
| Sunday- Thursday, October 18-22 | American Mining Congress | Las Vegas, NV |
| Friday- Sunday, October 23-25 | Fairshow '92 | North Las Vegas, NV |
| Monday- Thursday, October 26-29 | Geological Society of America | Cincinnati, OH |
| Tuesday- Thursday, November 17-19 | American Nuclear Society Winter Meeting | Chicago, IL |
| Thursday- Saturday, November 19-21 | Nevada Association of Counties | Fallon, NV |
| Wednesday, September 16 | NWIRE | A. Simmons |

| <u>Date</u> | <u>Event</u> | <u>Escorts</u> |
|---|---|-----------------|
| H. <u>Tours Scheduled</u> | | |
| Thursday- Friday, September 17-18 | NRC | T. Bjerstedt |
| Tuesday, September 22 | CRWMS M&O Program Management Review | TBD |
| Wednesday, September 23 | Beatty Chamber of Commerce | S. Tarr |
| Friday, September 25 | NARUC | A. Robison |
| Saturday, September 26 | Public Open House (P) | Various Escorts |
| Tuesday, October 6 | United States Council for Energy Awareness | TBD |
| Thursday, October 8 | Realtor Association (Las Vegas Board of Realtors) | TBD |
| Tuesday, October 13 | Senior Tripsters | TBD |
| Thursday, October 15 | Boulder City Senior Center | TBD |
| Thursday, October 15 (Tentative) | US/UK Defense Coordination Meeting | TBD |
| Friday, October 16 | NWTRB | A. Simmons |
| Saturday, October 17 | Public Open House (P) | Various Escorts |
| Tuesday, October 20 | Tonopah High School | TBD |
| Thursday, October 22 | Advisory Committee on Nuclear Waste | TBD |

| <u>Date</u> | <u>Event</u> | <u>Escorts</u> |
|---------------------------------------|--|-----------------|
| H. <u>Tours Scheduled</u> (Continued) | | |
| Tuesday, October 27 | Quail Estates West | TBD |
| Wednesday, October 28 | Southern NV Retired Teachers' Association | TBD |
| Friday, November 13 | Boy Scouts of America | M. Penovich |
| Wednesday, November 18 | Public Open House (P) | Various Escorts |
| Saturday, December 12 | Public Open House (P) | Various Escorts |
| Thursday, March 11, 1993 | Meadows School | TBD |

YMP:VFI-5573

for Maxwell Blanchard
Carl P. Gertz
Project Manager



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

WBS 1.2.3.5
QA: N/A

OCT 05 1992

Carl H. Johnson, State of Nevada, Carson City, NV
Phillip Niedzielski-Eichner, Nye County, Chantilly, VA
Dennis A. Bechtel, Clark County, Las Vegas, NV
Albert C. Douglas, City of Las Vegas, Las Vegas, NV
Philip S. Justus, NRC, Las Vegas, NV

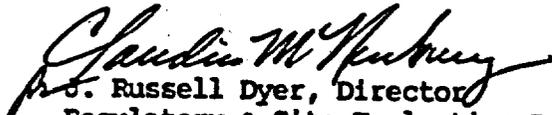
DAILY OPERATIONS REPORTS AND WEEKLY INTERACTIONS CALENDAR

Enclosed for your information are copies of the Daily Operations Reports for Yucca Mountain Site Characterization Project drill holes USW UZ N32, UE-25 UZ16, and USW UZ N31 (enclosure 1). These reports were prepared by Raytheon Services Nevada and cover September 21-25, 1992.

A copy of the Weekly Interactions Calendar (enclosure 2) is enclosed for your information. It includes a section providing the status of boreholes, trenches, and test pits.

A copy of the field test coordinator's report (enclosure 3) summarizing activities of the previous week and forecasting the activities planned for the current week is also included for your information.

If you need additional information regarding these reports, please contact Uel S. Clanton at (702) 794-7943.


J. Russell Dyer, Director
Regulatory & Site Evaluation Division

RSED:USC-126

Enclosures:

1. Daily Operations Reports
2. Weekly Interactions Calendar
3. Field Test Coordinator's Report

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 28, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3

Station: USW UZ N32

Drill Rig: CME-850

Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system to a total depth of approximately $\pm 180'$. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 25, 1992 (Rig Day 3)

**HOURS
FROM - TO**

OPERATIONS DESCRIPTION

| | |
|-------------|--|
| 0800 - 0830 | Service and start up rig and equipment. |
| 0830 - 1120 | Core run #6 from 18.35' to 21.39' (161 mins) 3.0' Rec. |
| 1120 - 1142 | Pull out of hole with coring assembly. Run Odex hammer. Rig up to ream. |
| 1142 - 1200 | Rig motor quit running. Repair rig. |
| 1200 - 1230 | Lunch. |
| 1230 - 1245 | Repair rig. |
| 1245 - 1257 | Begin ream cycle #3 at 9.69'. |
| 1257 - 1327 | Repair rig, clean out fuel filters. |
| 1327 - 1405 | Ream cycle #3 from 9.69' to 21.39' (48 mins). |
| 1405 - 1420 | Pull out Odex hammer. Run coring assembly. Rerun core bit RSN #37, a Longyear Impregnated diamond bit. |
| 1420 - 1508 | Core run #7 from 21.39' to 22.17' (40 mins) 0.3' Rec. |
| 1508 - 1605 | Pull out of hole with coring assembly. Change bits. Run RSN #16, Serial #L89739, a Longyear carbonado. |
| 1605 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 215 SCFM Reaming - 310 SCFM

| | | | |
|-----------------------|---------------------|----------------------|------------------|
| Ending Depth: | Cored 22.17' | Reamed 21.39' | Drilled 0 |
| Daily Footage: | Cored 3.82' | Reamed 11.70' | Drilled 0 |

Drilling Rep: Neal Walker, REECo

A/E Rep: James E. Anthony

Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 6-Visitors

Field Report Prepared By: James E. Anthony

Office Report Prepared By: James E. Anthony

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 28, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300
 Activity: Coring

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 25, 1992 (Rig Day 78)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|-----------------|--|
| 0800 - 0827 | Service and warm up equipment. |
| 0827 - 0851 | Complete Ream cycle #57 from 719.04' - 759.11' |
| 0851 - 0945 | Rig up and run deviation Survey at 757' found deviation to be 2 degrees and 10 minutes off vertical using a 2 degree tool. |
| 0945 - 1038 | Trip in hole with core assembly. |
| 1038 - 1114 | Core run #175 from 759.24' - 761.98' (12 min.), Rec. 1.6'. |
| 1114 - 1140 | Start Core run #176 |
| 1140 - 1210 | Lunch |
| 1210 - 1234 | Core run #176 from 761.98' - 765.85' (33 min.), Rec. 3.6'. |
| 1234 - 1340 | Core run #177 from 765.85' - 771.77' (55 min.), Rec. 5.9'. |
| 1340 - 1408 | Rig up and run deviation Survey through core pipe at 757' found deviation to be 2 degrees and 10 minutes off vertical using a 6 degree tool. |
| 1408 - 1446 | Core run #178 from 771.77' - 775.46' (31 min.), Rec. 1.9'. |
| 1446 - 1531 | Core run #179 from 775.46' - 776.79' (28 min.), Rec. 1.3'. |
| 1531 - 1600 | Core run #180 from 776.79' - 782.69' (19 min.), Rec. 3.5'. |
| 1600 - 1630 | Shut down and secure rig. |

CORING: Average air rate 714 SCFM
 Average vacuum rate 1180 SCFM

REAMING: Average air rate 1449 SCFM
 Average vacuum rate 1532 SCFM

Ending Depth: Cored 782.69' Reamed 759.11' Drilled 0
 Daily Footage: Cored 23.45' Reamed 3.76' Drilled 0

Drilling Rep: Richard Sowards, REECO
 A/E Rep: Richard W. Wright and David Putnam
 Personnel On Site: 2-RSN; 9-REECO; 2-USGS; 3-SMF; 7-Visitors

Field Report Prepared By: David Putnam
 Office Report Prepared By: Don Cunningham

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 25, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300
 Activity: Reaming

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 24, 1992 (Rig Day 77)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|---|
| 0800 - 0825 | Service and warm up equipment. |
| 0825 - 1000 | Rig maintenance; remove kelly hose and reverse ends. |
| 1000 - 1124 | Ream cycle #57. |
| 1124 - 1200 | Change orifice plate in the air processing and metering system from 1.50" to 2.00". Tested system with 2 and 3 air compressors on line. |
| 1200 - 1230 | Lunch |
| 1230 - 1450 | Ream cycle #57. |
| 1450 - 1510 | Dump bag house in Haz-Vac unit. |
| 1510 - 1600 | Ream cycle #57 from 724.01' to 755.35' (Haz-Vac down 10. min. due to overheating). |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: After changing orifice plate to 2" orifice, air flowing pressure reduced from 320 psig. to 120 psig for 2 compressors. Tested 3 compressors at 1907 SCFM and 180 psig.

CORING: Average air rate N/A
 Average vacuum rate N/A

REAMING: Average air rate 1415 SCFM
 Average vacuum rate 1364 SCFM

| | | | |
|-----------------------|----------------------|-----------------------|------------------|
| Ending Depth: | Cored 759.24' | Reamed 755.35' | Drilled 0 |
| Daily Footage: | Cored 00.00' | Reamed 31.34' | Drilled 0 |

Drilling Rep: Richard Sowards, REECO
A/E Rep: Richard W. Wright and David Putnam
Personnel On Site: 2-RSN; 9-REECO; 2-USGS; 3-SMF; 7-Visitors

Field Report Prepared By: David Putnam and Richard Wright
Office Report Prepared By: David Putnam and Richard Wright

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 25, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3

Station: USW UZ N32

Drill Rig: CME-850

Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system to a total depth of approximately $\pm 180'$. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 24, 1992 (Rig Day 2)

**HOURS
FROM - TO**

OPERATIONS DESCRIPTION

| | |
|-------------|--|
| 0800 - 0830 | Service and start up rig and equipment. |
| 0830 - 0916 | Core run #3 from 8.56' to 9.69' (27 mins) 1.2' Rec. |
| 0916 - 0935 | Pull out of hole with coring assembly. RSN #35, a Longyear impregnated diamond, was worn down and two pieces were broken off. Run Odex hammer. Rig up to ream. |
| 0935 - 1030 | Ream cycle #2 from 1.50' to 9.69' (52 mins). |
| 1030 - 1105 | Pull out Odex hammer. Run coring assembly. Run core bit RSN #37, Serial #L96316, a new Longyear impregnated diamond bit with 10 airways (5/64"W x 5/16"D). |
| 1105 - 1200 | Begin core run #4 at 9.69'. |
| 1200 - 1230 | Lunch. |
| 1230 - 1355 | Core run #4 from 9.69' to 14.60' (115 mins) 4.7' Rec. |
| 1355 - 1615 | Core run #5 from 14.60' to 18.35' (131 mins) 3.3' Rec. |
| 1615 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 121 SCFM Reaming - 371 SCFM

| | | | |
|-----------------------|---------------------|---------------------|------------------|
| Ending Depth: | Cored 18.35' | Reamed 9.69' | Drilled 0 |
| Daily Footage: | Cored 9.79' | Reamed 8.19' | Drilled 0 |

Drilling Rep: Neal Walker, REECo

A/E Rep: James E. Anthony

Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 8-Visitors

Field Report Prepared By: James E. Anthony

Office Report Prepared By: James E. Anthony

**YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
PRELIMINARY FIELD COMPOSITE BOREHOLE LOG**

BOREHOLE ID: USV UZH-32

STUDY PLAN NO: HX 2.4"

CORE SIZE: 9/23/92-

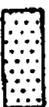
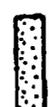
DRILL DATES: 9/23/92-

GROUND ELEV: _____

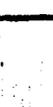
COORDINATES: N: _____
E: _____

TOTAL DEPTH: _____

ANGLE FROM VERT: _____ BEARING: _____

-  ALLUVIUM
-  NON-WELDED
-  PARTIALLY WELDED
-  DENSELY WELDED
-  VITROPHYRE
-  BASALTIC TUFF

Logging by Drilling Support Division, Drilling Support and Sample Management Dept, T&MSS

| RUNS DATES BITS | DRILLING RATE (ft/hr) | | | | FRAC FREQ (/5 ft) | DEPTH GRAPHIC LOG | LITHOLOGY/REMARKS |
|-----------------------|--------------------------|----|----|----|----------------------|---|--|
| | 0 | 10 | 20 | 50 | | | |
| DC-1 NA | | | | | 50 |  | |
| 1 9/23/92 | 5.2 | | | | 50 |  | 0.0 - 1.5 Alluvium, brown to light brown silt, with cobbles and angular pebbles of Tiva Canyon. |
| 7.0/6.8 97% | 4.3 | | | | 12 |  | ① 1.5 Alluvium/Tiva Canyon contact. |
| 3 9/24/92 | 2.5 | | | | 14 |  | 1.5 - X.X Tuff, ashflow, light brownish gray, moderately to densely welded, devitrified, 7% pumice fragments up to 2cm, 5% phenocrysts of sandstone. |
| 4 | 2.6 | | | | 14 |  | |
| 5 9.5/9.2 93% | 1.7 | | | | 20 |  | |
| 6 | | | | | 20 |  | |

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 24, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300
 Activity: Reaming

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 23, 1992 (Rig Day 76)

| <u>HOURS FROM - TO</u> | <u>OPERATIONS DESCRIPTION</u> |
|------------------------|--|
| 0800 - 0830 | Service and warm up equipment. |
| 0830 - 0902 | Replace the rear engine throttle on the driller's panel. |
| 0902 - 1011 | Core run #172 from 744.76' to 750.04' (69 min.), Rec 0.6'. |
| 1011 - 1039 | Repair core retrieving tool. |
| 1039 - 1101 | Retrieve core #172. |
| 1101 - 1150 | Core run #173 from 750.04' to 754.66' (49 min), Rec 3.7'. |
| 1150 - 1220 | Lunch |
| 1220 - 1247 | Retrieve core #173. |
| 1247 - 1310 | Core run #174 from 754.66' to 759.24' (14 min), Rec 2.5'. |
| 1310 - 1410 | Pull out of hole with core rods. |
| 1410 - 1418 | Ream cycle #57 using 2 Sullair compressors. |
| 1418 - 1449 | Clear return lines. |
| 1449 - 1513 | Take ream sample from 719.04' - 720.00'. |
| 1513 - 1600 | Ream cycle #57 from 720.00' - 724.01'. |
| 1600 - 1630 | Shut down and secure rig. |

CORING: Average air rate 425 SCFM
 Average vacuum rate 1150 SCFM

REAMING: Average air rate 1306 SCFM
 Average vacuum rate 1415 SCFM

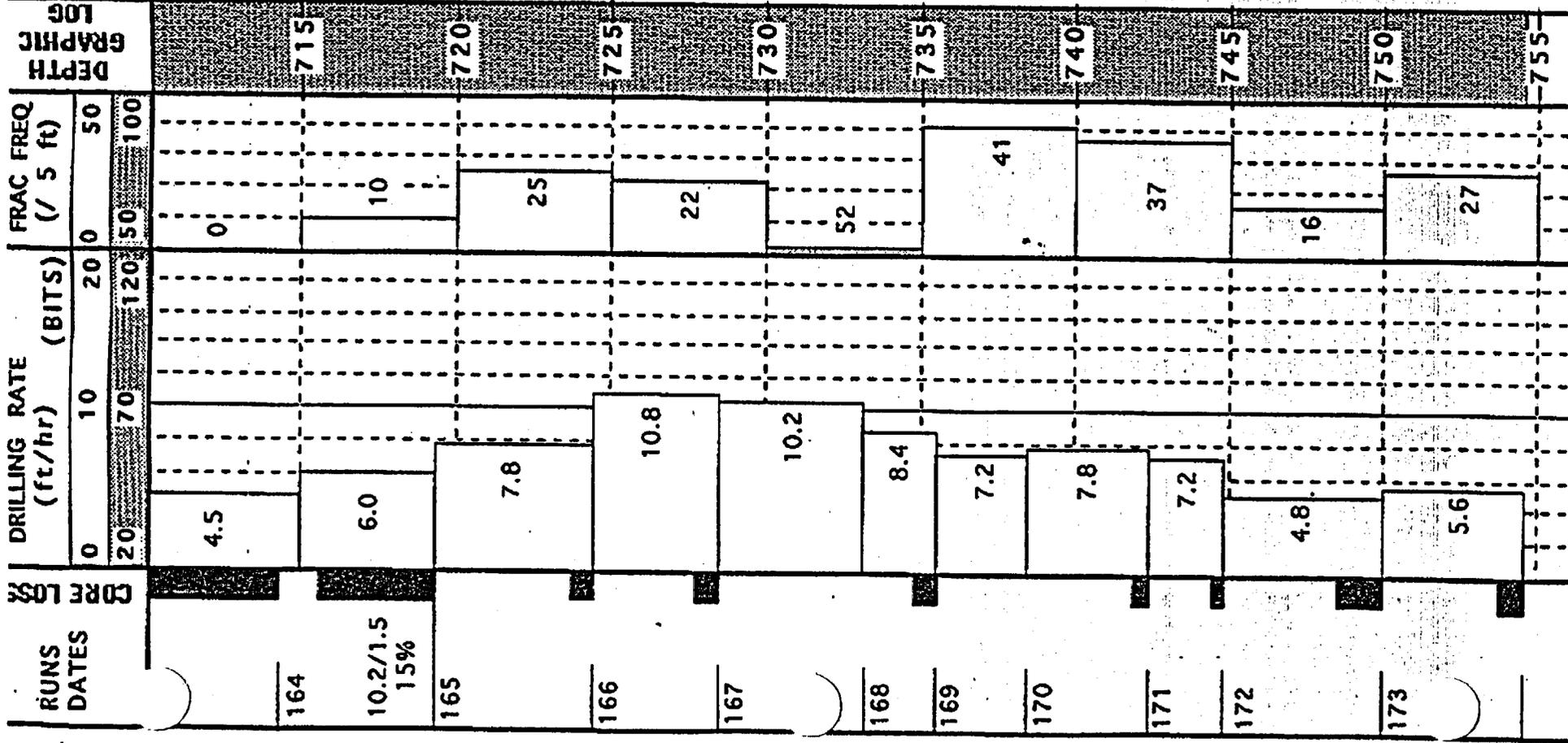
Ending Depth: Cored 759.24' Reamed 724.01' Drilled 0
 Daily Footage: Cored 14.48' Reamed 4.97' Drilled 0

Drilling Rep: Richard Sowards, REECO
 A/E Rep: David Putnam and Richard Wright
 Personnel On Site: 2-RSN; 9-REECO; 2-USGS; 4-SMF; 7-Visitors

Field Report Prepared By: David Putnam and Richard Wright
 Office Report Prepared By: David Putnam and Richard Wright

UE25 UZ-16

LITHOLOGY/REMARKS



721.5-xxx.x Tuff, ashflow; brownish-orange and medium gray mottled, densely welded, devitrified, <5% K-spar phenocrysts, 1% gray pumice. Possible lower lithophysal zone. 15% Lithophysae up to 5cm across partially to completely filled with 95% light gray silica, up to 5cm across. <1% blotite phenocrysts at 735.5 feet.

LUKE
RUNS,
DATES,
BITS

CORE LOSS
0 10 20
20 70 120

DRILLING RATE
(fc/hr)

HRAC FREQ
(/5 ft)

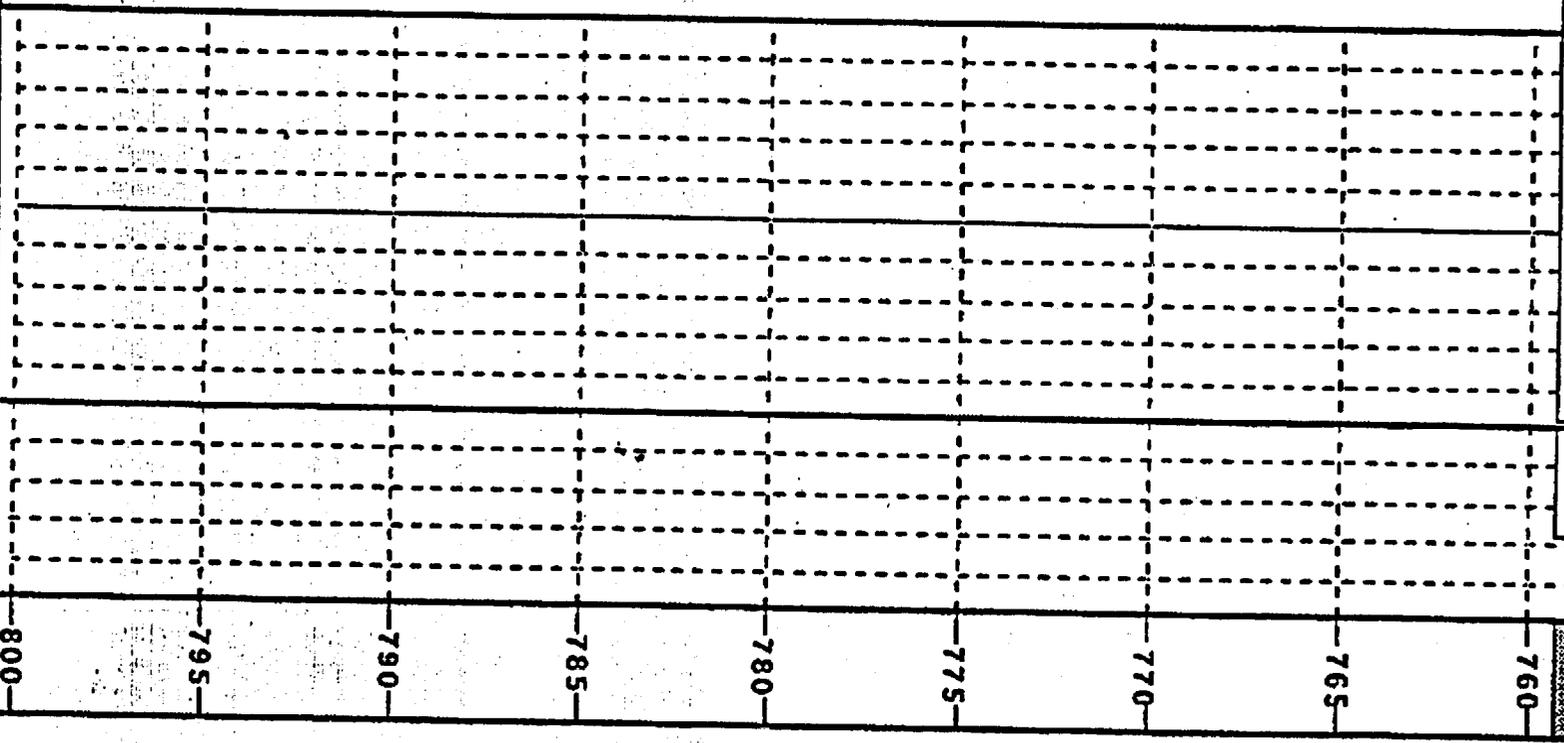
DEPTH GRAPHIC
755
760
765
770
775
780
785
790
795
800
UE25 uz #16 Page 19 of
LITHOLOGY/REMARKS

4
14.4/9.9
69%

19.8

28

755



RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 24, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N32
 Drill Rig: CME-850
 Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system to a total depth of approximately $\pm 180'$. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 23, 1992 (Rig Day 1)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|--|
| 0800 - 1330 | Rig up CME 850 drilling rig and equipment on location. |
| 1330 - 1332 | Drive sample #1 from 0' - 1.10', 1.1' Rec. |
| 1332 - 1350 | Rig up to ream. |
| 1350 - 1357 | Ream cycle #1 from 0' - 1.10'. |
| 1357 - 1404 | Drill from 1.10' - 1.50'. |
| 1404 - 1428 | Rig up to core. |
| 1428 - 1458 | Core run #01 from 1.50' to 3.53' (23 mins) 2.0' Rec. |
| 1458 - 1612 | Core run #02 from 3.53' to 8.56' (69 mins) 4.8' Rec. |
| 1612 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 128 SCFM Reaming and Drilling - 178 SCFM

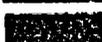
| | | | |
|----------------|-------------|--------------|---------------|
| Ending Depth: | Cored 8.56' | Reamed 1.10' | Drilled 1.50' |
| Daily Footage: | Cored 8.16' | Reamed 1.10' | Drilled 0.40' |

Drilling Rep: Neal Walker, REECo
 A/E Rep: James E. Anthony
 Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 8-Visitors

Field Report Prepared By: James E. Anthony
 Office Report Prepared By: James E. Anthony

**YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
PRELIMINARY FIELD COMPOSITE BOREHOLE LOG**

BOREHOLE ID: USW UZN-32
 STUDY PLAN NO: _____
 CORE SIZE: HX 2.4"
 DRILL DATES: 9/23/92-
 GROUND ELEV: _____
 COORDINATES: N: _____
 E: _____
 TOTAL DEPTH: _____
 ANGLE FROM VERT: _____ BEARING: _____

-  ALLUVIUM
-  NON-WELDED
-  PARTIALLY WELDED
-  DENSELY WELDED
-  VITROPHYRE
-  BEDDED TUFF

Logging by Drilling Support Division, Drilling Support and Sample Management Dept. T&MSS

| RUNS DATES BITS | CORE LOSS | DRILLING RATE (ft/hr) | | | FRAC FREQ. (/ 5 ft) | | DEPTH GRAPHIC LOG | LITHOLOGY/ REMARKS |
|-----------------------|-----------|--------------------------|----|-----|------------------------|-----|-------------------------|---|
| | | 0 | 10 | 20 | 0 | 50 | | |
| | | 0 | 10 | 20 | 0 | 50 | | |
| | | 20 | 70 | 120 | 50 | 100 | | |
| C-1 NA | | | | | | | | |
| 1 9/23/92 | 5.2 | | | | 3 | | | 0.0 - 1.5 Alluvium, brown to light brown silt, with cobbles and angular pebbles of Tiva Canyon. @ 1.5 Alluvium/Tiva Canyon contact. |
| 2 7.0/6.8 97% | 4.3 | | | | 7 | | | 1.5 - x.x Tuff, ashflow, light brownish gray, moderately to densely welded, devitrified, 7% pumice fragments up to 2cm, 5% phenocrysts of sanidine. |
| | | | | | | | 10 | |
| | | | | | | | 15 | |
| | | | | | | | 20 | |
| | | | | | | | 25 | |

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 23, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N31
 Drill Rig: CME-850

Activity: Rigging down and moving to new location

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 22, 1992 (Rig Day 13)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|-----------------|--|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0849 | Trip in hole with Odex hammer. |
| 0849 - 0929 | Ream cycle #23 from 163.56' - 183.55' (37 mins). |
| 0929 - 1003 | Pull out of hole Odex hammer. Trip in hole with coring assembly. Rerun bit RSN #33, a Christensen Carbonado. Rig up to core. |
| 1003 - 1038 | Core run #47 from 183.55' - 188.53' (26 mins) 3.9' Rec. |
| 1038 - 1132 | Core run #48 from 188.53' - 192.59' (37 mins) 1.5' Rec. |
| 1132 - 1200 | Pull out of the hole and lay down core rods. |
| 1200 - 1230 | Lunch. |
| 1230 - 1324 | Finish pulling out of the hole and laying down core rods. Trip in hole with Odex hammer bit on reaming assembly. Rig up to ream. |
| 1324 - 1354 | Ream cycle #24 from 183.55' - 192.59' (20 mins). |
| 1354 - 1452 | Trip out of hole and lay down drill rods. |
| 1452 - 1524 | Secure hole around 5.5" casing and install bore hole security cap. |
| 1524 - 1600 | Begin rigging down CME 850. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 298 SCFM Reaming - 305 SCFM

NOTE: Total Depth 192.59'. Gall Abend (UDR) for Allen Flint and Richard Morris with the SMD selected total Depth.

FINAL REPORT

| | | | |
|----------------|---------------|----------------|-----------|
| Ending Depth: | Cored 192.59' | Reamed 192.59' | Drilled 0 |
| Daily Footage: | Cored 9.04' | Reamed 29.03' | Drilled 0 |

Drilling Rep: Neal Walker, REECo
 A/E Rep: James E. Anthony
 Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 1-DOE; 12-Visitors

Field Report Prepared By: James E. Anthony
 Office Report Prepared By: James E. Anthony

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30

Date: September 23, 1992

Page: 1 of 1

Job Package No.: 92-03

Station: UE-25 UZ16

Drill Rig: LM300

Activity: Coring

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum. 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 22, 1992 (Rig Day 75)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|---|
| 0800 - 0818 | Service and warm up equipment. |
| 0818 - 0859 | Ream cycle #56 completed (679.03' - 719.04'). |
| 0859 - 1011 | Go in hole with core rods. |
| 1011 - 1109 | Core run #165 from 719.30' - 724.38', (38 min.), Rec. 4.4'. |
| 1109 - 1154 | Core run #166 from 724.38' - 728.42', (22 min.), Rec. 3.4'. |
| 1154 - 1222 | Core run #167 from 728.42' - 733.22', (28 min.), Rec. 4.8'. |
| 1222 - 1252 | Lunch |
| 1252 - 1318 | Lay down core #167. |
| 1318 - 1357 | Core run #168 from 733.22' - 735.53', (17 min.), Rec. 1.6'. |
| 1357 - 1441 | Core run #169 from 735.53' - 738.50', (25 min.), Rec. 2.9'. |
| 1441 - 1536 | Core run #170 from 738.50' - 742.25', (29 min.), Rec. 3.4'. |
| 1536 - 1610 | Core run #171 from 742.25' - 744.76', (21 min.), Rec. 2.2'. |
| 1610 - 1630 | Secure rig. |

Note: Haz Vac blower inlet Vac 14" while coring, Max. Operating Vacuum - 15".

CORING: Average air rate: 471 SCFM
Average vacuum rate: 1063 SCFM

REAMING: Average air rate: 1189 SCFM
Average vacuum rate: 1394 SCFM

| | | | |
|----------------|---------------|----------------|-----------|
| Ending Depth: | Cored 744.76' | Reamed 719.04' | Drilled 0 |
| Daily Footage: | Cored 25.46' | Reamed 3.36' | Drilled 0 |

Drilling Rep: Richard Sowards, REECO

A/E Rep: David Putnam

Personnel On Site: 1-RSN, 2-USGS, 5-SMF, 9-REECO, 1-DOE, 5-VISITORS

Field Report Prepared By: David Putnam

Office Report Prepared By: David Putnam

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 22, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300
 Activity: Reaming

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 21, 1992 (Rig Day 74)

| <u>HOURS FROM - TO</u> | <u>OPERATIONS DESCRIPTION</u> |
|------------------------|---|
| 0800 - 0918 | Service and warm up equipment. Safety meeting. |
| 0918 - 1005 | Ream cycle #56. Dust coming from around the 9 5/8" drill pipe. |
| 1005 - 1055 | Attempt to clear the return lines. |
| 1055 - 1200 | Run core barrel to clean out inside the 9 5/8" drill pipe. |
| 1200 - 1230 | Lunch. |
| 1230 - 1402 | Clean out to cored depth (719.30'), pull out of hole with coring assembly. |
| 1402 - 1610 | Ream cycle #56. Ream sample at 706.8' - 707.8'. Poor returns after ream sample, put 3 compressors on the hole. Plugging problems from 679.00' to 715.68'. |
| 1610 - 1630 | Secure rig. |

CORING: Average air rate: 0 SCFM
 Average vacuum rate: 0 SCFM

REAMING: Average air rate: 1019 SCFM
 Average vacuum rate: 1269 SCFM

| | | | |
|-----------------------|----------------------|-----------------------|------------------|
| Ending Depth: | Cored 719.30' | Reamed 715.68' | Drilled 0 |
| Daily Footage: | Cored 0 | Reamed 18.68' | Drilled 0 |

Drilling Rep: Richard Sowards, REECO
A/E Rep: David Putnam
Personnel On Site: 1-RSN, 2-USGS, 3-SMF, 9-REECO, 1-DOE, 6-VISITORS

Field Report Prepared By: David Putnam
Office Report Prepared By: David Putnam

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 22, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3

Station: USW UZ N31

Drill Rig: CME-850

Activity: Tripping in hole to ream

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 21, 1992 (Rig Day 12)

| <u>HOURS FROM - TO</u> | <u>OPERATIONS DESCRIPTION</u> |
|------------------------|---|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0856 | Rig crew viewed movie on TQM at UZ-16. |
| 0856 - 0917 | Core run #39 from 144.55' - 149.55' (11 mins) 4.7' Rec. |
| 0917 - 0942 | Core run #40 from 149.55' - 154.55' (13 mins) 5.0' Rec. |
| 0942 - 1014 | Core run #41 from 154.55' - 159.55' (15 mins) 5.0' Rec. |
| 1014 - 1039 | Core run #42 from 159.55' - 163.56' (14 mins) 4.0' Rec. |
| 1039 - 1143 | Start pulling out of hole with coring assembly. Hole tight. Ream out open hole. Finish pulling out of hole. Trip in hole with reaming assembly and Odex hammer. Rig up to ream. |
| 1143 - 1204 | Ream cycle #22. |
| 1204 - 1234 | Lunch. |
| 1234 - 1317 | Ream cycle #22 from 144.55' - 163.56' (60 mins). |
| 1317 - 1347 | Pull out of hole with reaming assembly. Trip in hole with coring assembly. Rerun bit RSN #33, a Christensen Carbonado. Rig up to core. |
| 1347 - 1404 | Core run #43 from 163.56' - 168.53' (4 mins) 5.0' Rec. |
| 1404 - 1432 | Core run #44 from 168.53' - 173.54' (19 mins) 5.0' Rec. |
| 1432 - 1459 | Core run #45 from 173.54' - 178.55' (17 mins) 5.0' Rec. |
| 1459 - 1527 | Core run #46 from 178.55' - 183.55' (18 mins) 4.7' Rec. |
| 1527 - 1600 | Start pulling out of hole with coring assembly. Hole tight. Ream out open hole. Finish pulling out of hole. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 257 SCFM Reaming - 345 SCFM

| | | | |
|----------------|---------------|----------------|-----------|
| Ending Depth: | Cored 183.55' | Reamed 163.56' | Drilled 0 |
| Daily Footage: | Cored 39.00' | Reamed 19.01' | Drilled 0 |

Drilling Rep: Neal Walker, REECo

A/E Rep: James E. Anthony

Personnel On Site: 1-RSN; 4-REECo; 2-SMF; 1-USGS; 1-DOE; 8-Visitors

Field Report Prepared By: James E. Anthony

Office Report Prepared By: James E. Anthony

WEEKLY INTERACTIONS CALENDAR

ENCLOSURE 2

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/25/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|--------------------------------------|-------------------------------------|------------------------------|----------------------------------|---|
| 9/30- 10/1/92 (Las Vegas, NV) | NWTRB Dry Run ** | D. Harrison | Cooper (Hoffman-SAIC) | M&O LLNL PNL | |
| 10/14-15/92 Las Vegas, NV (Plaza Suite Hotel) | NWTRB Full Board | D. Harrison | Cooper (Hoffman-SAIC) | M&O LLNL PNL | Source term; 1) Concept and release mechanisms, 2) spent fuel testing, 3) PA and design implications. |
| 10/16/92 Las Vegas, NV | NWTRB Yucca Mountain Site Tour | | Cooper (Hoffman-SAIC) | | |
| 10/20/92 Las Vegas, NV | ACNW WG on Human Intrusion | | Gil (LeRoy-M&O) | | Discuss methodologies for assessment of potential for natural resources at YM, and relationship between such resources and potential for human intrusion. |
| 10/21/92 Las Vegas, NV | ACNW 47th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD. |
| 10/22/92 | ACNW Yucca Mountain and NTS Tours | | Gil (LeRoy-M&O) | | Agenda TBD. |
| 10/23/92 | ACNW GIS Tour | | Gil (LeRoy-M&O) | | Tour will take place in the morning only. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE CLOSED TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/25/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|--|-------------------------------------|------------------------------|----------------------------------|--|
| 10/29/92 San Antonio, TX | NRC TE: CNWRA Functional Analysis of 10CFR60 | | Bjerstedt (LeRoy-M&O) | M&O | Discuss CNWRA activities related to systems engineering. |
| 11/4-6/92 Denver, CO (TENTATIVE) | NWTRB SG&G Panel Meeting | | Cooper (Hoffman-SAIC) | M&O | Discuss ESF and repository design. |
| 11/16-17/92 Bethesda, MD | ACNW 48th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD |
| 11/17/92 Albuquerque, NM | NRC TE: Volcanism | Cooper (Jerez-M&O) | Bjerstedt (LeRoy-M&O) | M&O LANL | Discuss DOE volcanism studies as detailed in LANL report. |
| 11/18/92 Bethesda, MD | ACNW WG Climate | | Gil (LeRoy-M&O) | | Discuss the potential for climate changes in Southern Basin and Range and the impact on natural processes affecting PA of potential repository at YM. Original scheduled 11/19/91, this has been rescheduled from 4/22/92. |
| Date and Location TBD Rockville, MD | Interaction Planning Meeting | Bjerstedt (LeRoy-M&O) | Bjerstedt (LeRoy-M&O) | M&O | Discuss/plan DOE/NRC interactions for first half 1993. Previously scheduled 11/18/92. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE CLOSED TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/25/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|---|--|------------------------------|----------------------------------|--|
| 11/18-20/92 Albuquerque, NM | DOE Workshop on Expert Judgment | Dyer/Boak (Younker-M&O, Van Luik-M&O, Weaver-M&O) | Simmons (Hoffman-SAIC) | M&O | Examine DOE's use of expert judgment for YMP, learn how other projects have used expert judgment, make recommendations for future use, fulfill NWTRB recommendation to hold workshop. |
| 12/14-15/92 Rockville, MD | NRC TE: Total System Performance Assessment | Boak (Pahwa-M&O) | Bjerstedt (LeRoy-M&O) | M&O SNL PNL | |
| 12/16/92 Bethesda, MD | ACNW WG on PA - Phase 2 HLW Interactive PA by NRC | Boak (Van Luik-M&O) | Gil (LeRoy-M&O) | M&O SNL | Will discuss progress of Phase 2 PA effort. Also will hear briefing from DOE on status of TSPA. |
| 12/17-18/92 Bethesda, MD | ACNW 49th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD. |
| Delayed to early 1993 Albuquerque, NM | WIPP Roundtable discussion - NRC observation | Boak (Van Luik-M&O) | Bjerstedt (LeRoy-M&O) | M&O SNL PNL | NRC staff observe interaction between YMPO PA and WIPP PA. Previously scheduled 10/27/92. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE CLOSED TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/25/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|-----------------------------|-------------------------------------|------------------------------|----------------------------------|--|
| Delayed to early 1993. Carlsbad, NM | Tour of WIPP Site ** | Boak (Van Luik-M&O) | Bjerstedt (LeRoy-M&O) | M&O | Previously scheduled 10/28/92. |
| 1/5-6/93 Arlington, VA | NWTRB Full Board Meeting | | Cooper (Hoffman-SAIC) | | M&O systems update and ESF and respository design follow-up. |
| 2/93 or 3/93 TBD | NWTRB HG&G Panel Meeting | | Cooper (Hoffman-SAIC). | | Agenda TBD. |
| 4/20-23/93 Reno, NV | NWTRB Full Board Meeting | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 6/1/93 TBD | NWTRB International Trip | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 7/12-15/93 Denver, CO | NWTRB Full Board Meeting | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 10/19-22/93 Las Vegas, NV | NWTRB Full Board Meeting | | Cooper (Hoffman-SAIC) | | Agenda TBD. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE CLOSED TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

DRILLING, TRENCHING, AND TEST PIT ACTIVITIES
9/25/92

| <u>DESIGNATION</u> | <u>PLANNED START DATE</u> | <u>PLANNED END DATE</u> | <u>BACKFILL DATE</u> | <u>YMPO SITE CONTACT</u> | <u>COMMENTS</u> |
|---|---------------------------|-------------------------|----------------------|--------------------------|---|
| Midway Valley Investigations | 7/22/92 | 8/7/92 | N/A | Sullivan | Four (one additional is optional) gravity and Magnetic evaluation lines going East-West across Midway Valley were completed. |
| Soil and Rock Properties Test Pits (Phase II) | 8/17/92 | 10/31/92 | TBD | Williams | Excavate 41 test pits for engineering properties of planned roads, one each fields, and concrete aggregate sources. Data for design of ESF. |
| Fran Ridge Test Pit No. 1 | 8/24/92 | 9/15/92 | N/A | Girdley | Bedrock excavation in Topopah by controlled blasting. Fracture network mapping will be undertaken. |
| Quaternary Faulting - Site Area | 8/17/92 | 8/22/92, Complete | TBD | Sullivan | Six trenches across Quaternary faults were excavated for detailed mapping. Four pavement sites were cleared. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE CLOSED TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

DRILLING, TRENCHING, AND TEST PIT ACTIVITIES
9/25/92

| <u>DESIGNATION</u> | <u>PLANNED START DATE</u> | <u>PLANNED END DATE</u> | <u>BACKFILL DATE</u> | <u>YMPO SITE CONTACT</u> | <u>COMMENTS</u> |
|--|---------------------------|-------------------------|----------------------|--------------------------|--|
| Volcanic Centers Soil Test and Sample Collection | 9/2/92 | 9/3/92 | 9/3/92 | Cooper | Continue examination of soil development on volcanic rocks to test results of chronology studies. Collect samples of volcanic rocks for petrology studies. This activity began July 1991 and occurs periodically. This was successfully completed. |
| Lathrop Wells Cinder Cone Volcanic Trenching | 9/8/92 | 9/16/92 | 9/16/93 | Cooper | Continuation of the volcanic studies. |
| Unsaturated Zone Borehole No. 16 | 5/27/92 | 3/24/93 | N/A | Long | Unsaturated zone site characterization and vertical seismic profiling. |
| Neutron-Access Boreholes Phase II (12 boreholes) | 8/3/92 | TBD | N/A | Girdley | Core taken from these holes will be used by USGS for determination of moisture content and to construct tritium profiles. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE CLOSED TO THE PUBLIC**



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

WBS 1.2.3
QA: N/A

OCT 01 1992

J. Russell Dyer, YMP, NV
Winfred A. Wilson, YMP, Mercury, NV, M/S 717

FIELD TEST COORDINATOR'S REPORT FOR THE WEEK ENDING SEPTEMBER 25, 1992

UZ-16

Scope of Activity: A borehole approximately 1700 feet in depth will be drilled using the LM-300 drilling system. The primary purpose of the hole will be for vertical seismic profile testing, although other tests such as air permeability, hydrogeochemistry, and matrix hydrologic properties are also being planned. Drilling is scheduled from May through December 1992, following pad construction in March 1992.

Status as of September 25, 1992: Borehole UZ-16 continues to be drilled with the LM-300 drill rig. Coring continued from 719.30 feet to 782.69 feet and the borehole was reamed from 697.00 feet to 759.11 feet.

NEUTRON-ACCESS BOREHOLES

Scope of Activity: Approximately 24 shallow boreholes will be drilled/cored for neutron logging by the U.S. Geological Survey (USGS) in order to evaluate natural infiltration. Core taken from these holes will be used by USGS for determination of moisture content and to construct tritium profiles. The drilling operation utilizes an Odex drilling system, which produces HQ core and a cased hole having a diameter of approximately six inches. The drilling program is being implemented in two phases, each consisting of 12 boreholes that will take several months to complete.

Status as of September 25, 1992: Boreholes USW-31 and USW-32 are a pair of holes adjacent to each other in Split Wash near the trace of the Ghost Dance fault. Both of these holes were drilled with the CME 850 drill rig, and SF₆ tracer gas was injected during drilling operations.

Drilling of borehole USW-UZN-31 was completed on September 22, 1992. The hole interval from 144.5 feet to 192.59 feet was cored and the hole reamed from 144.5 feet to 192.59 feet. The hole was extended beyond the target depth of 180 feet for the purpose of extending into the Topopah cap rock. Total depth of the USW-UZN-31 borehole is 192.59 feet.

Commencement of drilling on borehole USW-UZN-32 began September 23, 1992. By the end of shift on Friday, September 25, 1992, coring had reached a depth of 22.17 feet; ream depth was 22.17 feet. All samples recovered were dry.

OCT 01 1992

QUATERNARY FAULTING WITHIN THE SITE AREA INVESTIGATIONS

Scope of Activity: Pavements and trenches will be excavated to provide exposures of Quaternary deposits and faults for mapping by geologists from the USGS as described in Study Plan 8.3.1.17.4.6 Quaternary Faulting in the Site Area. Planned activities include excavation of new trenches and modification of existing trenches on the Windy Wash fault, Solitario Canyon fault, and Stagecoach Road fault, and modification of existing exposures of the Paintbrush Canyon fault west of Busted Butte in the sand ramps by developing pavements.

Status as of September 25, 1992: Geologic mapping, sampling, and interpretation continues on trench excavations and pavement clearings completed during previous weeks. Trenches and pavement clearings associated with Quaternary Fault Studies, include those at Busted Butte, Midway Valley, and Armagosa Valley.

SOIL AND ROCK PROPERTIES

Scope of Activity: Objectives of this investigation are to characterize the soil and rock conditions that will influence, or be influenced by, the construction of the Exploratory Studies Facility surface and subsurface access facilities. Phase I of this activity was previously completed and included a total of 32 test pits and one drill hole (NRG-1). Ongoing Phase II activities include 41 additional test pits and pavement clearing at NRG-1.

Status as of September 25, 1992: Excavation of the 41 Phase II test pits is continuing. During this reporting period, 18 additional test pits were excavated. A total number of 39 test pits have now been excavated since work commenced on September 15, 1992. Sampling and geologic description/interpretation of the excavated soils physical properties has been completed for all pits excavated by the end of the shift on Friday, September 25, 1992.

CHARACTERIZATION OF STRUCTURAL FEATURES IN THE SITE AREA

Scope of Activity: Objectives of this investigation are to conduct prototype work for development of equipment and techniques for shaft mapping in the Exploratory Studies Facility. Developmental work is to be completed in an enlarged and deepened circular test pit on the east side of Fran Ridge. The area around the pit disturbed during the original excavation will be cleaned to the rock surface for use in pavement studies for Surface Fracture Network Studies.

OCT 01 1992

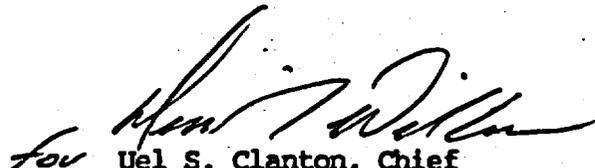
Status as of September 25, 1992: Clearing of pavement at Fran Ridge commenced on September 8, 1992, and is ongoing. The pavement clearing is being completed with hand labor and a blowpipe supplying a jet of air and water. Equipment supporting clearing operations included a front end loader, backhoe, air compressor, and water truck.

VOLCANISM EXCAVATIONS

Scope of Activity: Test pits and trenches will be excavated at the Lathrop Wells Volcanic Center and at the Cima volcanic field in order to test alternative models of eruptive histories of cinder cone volcanic activity. The excavations will provide exposures of volcanic materials (lava flows, pyroclastic deposits) and soils for examination and collection of samples. Planned activities include collection of samples for age determinations by multiple methods, description and collection of samples for evaluation of soil development on volcanic units, exposure of contact relations to aid stratigraphic studies for mapping of volcanic centers, and collection of samples for petrologic analysis.

Status as of September 25, 1992: Examination and interpretation of geologic conditions continued on the excavation completed on the north flank of the Lathrop Wells cone. The excavation is being evaluated to determine if additional excavation is necessary.

If you have any questions, please contact Kenneth J. Skipper at 794-7944.



Uel S. Clanton, Chief
Site Investigations Branch
Regulatory & Site Evaluation Division

RSED:KJS-101



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

WBS 1.2.3.5
QA: N/A

SEP 28 1992

Carl H. Johnson, State of Nevada, Carson City, NV
Phillip Niedzielski-Eichner, Nye County, Chantilly, VA
Dennis A. Bechtel, Clark County, Las Vegas, NV
Albert C. Douglas, City of Las Vegas, Las Vegas, NV
~~Philip S. Justus, NRC, Las Vegas, NV~~

DAILY OPERATIONS REPORTS AND WEEKLY INTERACTIONS CALENDAR

Enclosed for your information are copies of the Daily Operations Reports for Yucca Mountain Site Characterization Project drill holes UE-25 UZ16, and USW UZ N31, (enclosure 1). These reports were prepared by Raytheon Services Nevada and cover September 14-18, 1992.

A copy of the Weekly Interactions Calendar (enclosure 2) is enclosed for your information. It includes a section providing the status of boreholes, trenches, and test pits.

A copy of the field test coordinator's report (enclosure 3) summarizing activities of the previous week and a forecast of the activities planned for the current week is also included for your information.

If you need additional information regarding these reports, please contact Uel S. Clanton at (702) 794-7943.

RSED:USC-5750

Russell Dyer
Russell Dyer, Director
Regulatory & Site Evaluation Division

Enclosures:

1. Daily Operations Reports
2. Weekly Interactions Calendar
3. Field Test Coordinator's Reports

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 21, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300
 Activity: Reaming

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 18, 1992 (Rig Day 73)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|-----------------|--|
| 0800 - 0850 | Repair hydraulic connection to cathead, service and warm up equipment. |
| 0850 - 0930 | Trip in hole with core rods. |
| 0930 - 1045 | Core run # 163 from 709.08' - 714.27', Rec. 0.2', 69 min. |
| 1045 - 1135 | Take anti-jam assembly off core barrel. Run core barrel. |
| 1135 - 1153 | Core Run # 164 from 714.27' - 719.30', Rec. 0.9', 49 min. |
| 1153 - 1228 | Lunch. |
| 1228 - 1314 | Core run #164 |
| 1314 - 1324 | Survey rig. |
| 1324 - 1428 | Pull out of the hole with core rods. |
| 1428 - 1526 | Ream cycle #56 from 679.03' - 697.00'. |
| 1526 - 1600 | Working tight hole. |
| 1600 - 1630 | Secure rig. |

CORING: Average air rate: 441 SCFM
 Average vacuum rate: 1183 SCFM

REAMING: Average air rate: 1182 SCFM
 Average vacuum rate: 1258 SCFM

| | | | |
|----------------|---------------|----------------|-----------|
| Ending Depth: | Cored 719.30' | Reamed 697.00' | Drilled 0 |
| Daily Footage: | Cored 10.22' | Reamed 17.97' | Drilled 0 |

Drilling Rep: Richard Sowards, REECO
 A/E Rep: David Putnam and Richard W. Wright
 Personnel On Site: 2-RSN, 2-USGS, 5-SMF, 9-REECO, 2-DOE, 1-VISITORS

Field Report Prepared By: David Putnam
 Office Report Prepared By: Richard W. Wright

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 21, 1992
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Job Package No.: 91-9, Revision 3

Station: USW UZ N31

Drill Rig: CME-850

Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 18, 1992 (Rig Day 11)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|---|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0845 | Conference with USGS. (considering running a water probe) |
| 0845 - 0929 | Start tripping in hole with Odex hammer bit. Pull out of hole with Odex hammer bit. Trip in hole with coring assembly. Rerun core bit RSN #36, a Christensen PDC. Rig up to core. Blow out hole to check for water. No water, only dry air. |
| 0929 - 0943 | Core run #34 from 119.56' - 124.56' (2 mins) 2.2' Rec. |
| 0943 - 1014 | Pull out of hole with coring assembly. Trip in hole with reaming assembly and Odex hammer. Rig up to ream. |
| 1014 - 1110 | Ream cycle #20 from 104.56' - 124.56' (50 mins). |
| 1110 - 1139 | Pull out of hole with reaming assembly. Trip in hole with coring assembly. Run bit RSN #33, Serial #2S27751, a Christensen Carbonado. |
| 1139 - 1207 | Core run #35 from 124.56' - 129.55' (7 mins) 4.8' Rec. |
| 1207 - 1237 | Lunch. |
| 1237 - 1250 | Core run #36 from 129.55' - 134.55' (5 mins) 5.0' Rec. |
| 1250 - 1315 | Core run #37 from 134.55' - 139.55' (11 mins) 5.0' Rec. |
| 1315 - 1341 | Core run #38 from 139.55' - 144.55' (15 mins) 5.0' Rec. |
| 1341 - 1435 | Pull out of hole with coring assembly. Hole tight. Work coring assembly and ream hole to work pipe free. Trip in hole with reaming assembly and Odex hammer bit. Rig up to ream. |
| 1435 - 1520 | Ream cycle #21 from 124.56' - 144.55' (42 mins). |
| 1520 - 1600 | Pull out of hole with reaming assembly. Trip in hole with coring assembly. Rerun bit RSN #33, a Christensen Carbonado. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 296 SCFM Reaming - 326 SCFM

| | | | |
|----------------|---------------|----------------|-----------|
| Ending Depth: | Cored 144.55' | Reamed 144.55' | Drilled 0 |
| Daily Footage: | Cored 24.99' | Reamed 39.99' | Drilled 0 |

Drilling Rep: Neal Walker, REECo

A/E Rep: James E. Anthony

Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 1-DOE; 7-Visitors

Field Report Prepared By: James E. Anthony

Office Report Prepared By: James E. Anthony

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUGGA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 18, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300

Activity: Going in hole to core.

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 17, 1992 (Rig Day 72)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|-----------------|--|
| 0800 - 0845 | Service and warm up equipment. |
| 0845 - 0915 | Core run # 160 from 694.55' - 700.79', Rec. 1.3', 19 min. |
| 0915 - 1140 | Rig was shut down due to low transmission oil. Called lube truck and refilled reservoir. |
| 1140 - 1200 | Core Run # 161 from 700.79' - 705.75', Rec. 1.1', 17 min. |
| 1200 - 1230 | Lunch. |
| 1230 - 1250 | Repair oil leak. |
| 1250 - 1318 | Lay down core # 161. |
| 1318 - 1410 | Core run #162 from 705.75' - 709.08', Rec. 1.7', 26 min. |
| 1410 - 1600 | Pull out of hole with core assembly. Changed out bit and connections. New bit- RSN # 14 SN 2S 25769, carbonado, 8 airways, 4-6 diamonds. Anti-jam assembly with a triple tube liner is in place. Ran in hole with 2 stands of core rods. |
| 1600 - 1630 | Secure rig. |

CORING: Average air rate: 544 SCFM
 Average vacuum rate: 1139 SCFM

REAMING: Average air rate: 0 SCFM
 Average vacuum rate: 0 SCFM

| | | | |
|-----------------------|----------------------|-----------------------|------------------|
| Ending Depth: | Cored 709.08' | Reamed 679.03' | Drilled 0 |
| Daily Footage: | Cored 14.53' | Reamed 0 | Drilled 0 |

Drilling Rep: Richard Sowards, REECO

A/E Rep: David Putnam

Personnel On Site: 1-RSN, 2-USGS, 4-SMF, 9-REECO, 1-DOE, 3-VISITORS

Field Report Prepared By: David Putnam

Office Report Prepared By: David Putnam

| RUNS DATES | CORE LOSS | DRILLING RATE (ft/hr) | | | FRAC FREQ (/ 5 ft) | DEPTH ft | LITHOLOGY/ REMARK |
|------------------------|-----------|--------------------------|-------|--------|-----------------------|-------------|----------------------|
| | | 0-20 | 20-70 | 70-120 | | | |
| 156 9/14/92 | | 4.7 | | | 33 | 675 | |
| 157 5.8/5.0 86% | | 4.7 | | | 45 | 680 | |
| 158 9/16/92 | | 7.2 | | | 15 | 685 | |
| 159 15.4/6.1 39% | | 24.6 | | | 12 | 690 | |
| 9/17/92 | | 19.4 | | | 13 | 695 | |
| 161 | | 17.4 | | | 15 | 700 | |
| 162 14.5/4.1 28% | | 7.8 | | | | 705 | |
| | | | | | | 710 | |

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 18, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3

Station: USW UZ N31

Drill Rig: CME-850

Activity: Tripping in hole to ream

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ± 180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 17, 1992 (Rig Day 10)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|-----------------|---|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0930 | Repair crack in guide body of Odex hammer bit. Install Odex bit in guide. |
| 0930 - 0941 | Trip in hole with Odex hammer bit. Rig up to ream. |
| 0941 - 1029 | Ream cycle #18 from 79.44' - 94.54' (48 mins). |
| 1029 - 1056 | Pull out of hole with reaming assembly. Trip in hole with coring assembly. Run bit RSN #36, Serial #2S28260, a Christensen PDC with 15, 5/16" diameter cutters and 10 air courses (5 at 3/32"D x 7/32"W and 5 at 3/32"D x 9/32"W). Depth from bottom of air courses to cutters is 1/4". |
| 1056 - 1115 | Core run #29 from 94.54' - 99.56' (4 mins) 5.0' Rec. |
| 1115 - 1132 | Core run #30 from 99.56' - 104.56' (5 mins) 4.8' Rec. |
| 1132 - 1145 | Hole tight. Work coring assembly and ream hole to work pipe free. |
| 1145 - 1203 | Pull out of hole with coring assembly. |
| 1203 - 1238 | Lunch. |
| 1238 - 1313 | Trip in hole with reaming assembly and Odex hammer. Rig up to ream. |
| 1313 - 1345 | Ream cycle #19 from 94.54' - 104.56' (29 mins). |
| 1345 - 1426 | Pull out of hole with reaming assembly. Trip in hole with coring assembly. Rerun bit RSN #36, a Christensen PDC. |
| 1426 - 1440 | Core run #31 from 104.56' - 109.56' (3 mins) 4.9' Rec. |
| 1440 - 1451 | Core run #32 from 109.56' - 114.56' (2 mins) 3.7' Rec. |
| 1451 - 1530 | Core run #33 from 114.56' - 119.56' (2 mins) 4.9' Rec. Waited 30 mins for SMF to log and package previous cores before pulling run #33 from hole. |
| 1530 - 1600 | Pull out of hole with coring assembly. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 419 SCFM Reaming - 312 SCFM

Ending Depth: Cored 119.56' Reamed 104.56' Drilled 0
 Daily Footage: Cored 25.02' Reamed 25.12' Drilled 0

Drilling Rep: Neal Walker, REECO

A/E Rep: James E. Anthony

Personnel On Site: 1-RSN; 4-REECO; 3-SMF; 1-USGS; 1-DOE; 7-Visitors

Field Report Prepared By: James E. Anthony

Office Report Prepared By: James E. Anthony

| RHS DATES BITS | CORE LOSS | | | | DEPTH GRAPHIC LOG | LITHOLOGY / REMARKS |
|----------------|-----------|-------|--------|------|-------------------|---------------------|
| | 0-20 | 10-70 | 20-120 | 0-50 | | |
| 25 | 8.8 | 11.4 | 37 | 40 | 75 | |
| 26 | 10.0 | 11.1 | 22 | 37 | 80 | |
| 27 | 11.5 | 11.1 | 19 | 19 | 85 | |
| 28 | 11.5 | 11.1 | 12 | 12 | 90 | |
| 29 | 75.6 | 97% | 18 | 18 | 95 | |
| 30 | 60.0 | 97% | 8 | 8 | 100 | |
| 31 | 102.0 | 97% | 12 | 12 | 105 | |
| 32 | 150.0 | 97% | 7 | 7 | 110 | |
| 33 | | 97% | | | 115 | |

@84.5 Shardy Base Contact
 84.5-106.5 Tuff, ashflow: grayish orange, nonwelded, vitric; 10% pumice fragments; 10% phenocrysts, sandine, black glass shards.

@106.5 Tiva Shardy Base/Bedded Tuff Contact
 106.5-xxxx Tuff, ashfall; white to pale yellowish-orange, nonwelded, vitric; abundant pumice fragments.

| RUNS DATES BITS | CORE LOSS | DRILLING RATE (ft/hr) | | | FRAC FREQ (/ 5 ft) | | DEPTH GRAPHIC LOG | LITHOLOGY/ REMARKS |
|-----------------------|-----------|--------------------------|----|-----|-----------------------|-----|-------------------------|--------------------|
| | | 0 | 10 | 20 | 0 | 50 | | |
| | | 20 | 70 | 120 | 50 | 100 | | |
| 25.0/23.2 93% | | 150.0 | | | 6 | | | |
| | | | | | | | 120 | |
| | | | | | | | 125 | |
| | | | | | | | 130 | |
| | | | | | | | 135 | |
| | | | | | | | 140 | |
| | | | | | | | 145 | |
| | | | | | | | 150 | |
| | | | | | | | 155 | |
| | | | | | | | 160 | |

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LITHOLOGY/ REMARKS

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 17, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N31
 Drill Rig: CME-850
 Activity: Reaming

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 16, 1992 (Rig Day 9)

**HOURS
FROM - TO**

OPERATIONS DESCRIPTION

| | |
|-------------|--|
| 0600 - 0830 | Service and start up equipment. |
| 0830 - 0844 | Standby ready to work. No USGS representative on location. |
| 0844 - 0855 | Ream cycle #17 from 74.97' - 79.44' (11 mins). |
| 0855 - 1125 | Sheared stem inside Odex hammer bit. Pull out of hole and inspect. Left bottom portion of bit in hole. Rig up to retrieve portion of bit left in hole. |
| 1125 - 1140 | Run USGS camera and view portion of bit in the hole. |
| 1140 - 1200 | Finish rigging up to retrieve bit portion. |
| 1200 - 1230 | Lunch. |
| 1230 - 1348 | Trip in and out of the hole with spear three times attempting to retrieve bottom of bit. Retrieved all of bit from the hole on the third attempt. |
| 1348 - 1400 | Rig down spear. |
| 1400 - 1600 | Standby ready to work. Waiting on replacement Odex Hammer. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - N/A Reaming - 306 SCFM

| | | | |
|----------------|--------------|---------------|-----------|
| Ending Depth: | Cored 94.54' | Reamed 79.44' | Drilled 0 |
| Daily Footage: | Cored 0 | Reamed 4.47' | Drilled 0 |

Drilling Rep: Neal Walker, REECo
 A/E Rep: James E. Anthony
 Personnel On Site: 1-RSN; 7-REECo; 3-SMF; 1-USGS; 9-Visitors

Field Report Prepared By: James E. Anthony
 Office Report Prepared By: James E. Anthony

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 17, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300
 Activity: Coring

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 16, 1992 (Rig Day 71)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|------------------------|---|
| 0800 - 0845 | Work on hydraulic leak at the torque gauge, service and start up equipment. |
| 0845 - 0930 | Work tight hole. |
| 0930 - 1125 | Ream cycle # 55 from 659.00' - 679.03'. |
| 1125 - 1200 | Pick up core barrel and go in hole with core rods. RSN # 13 Christensen Strata-Pak SN # 2S 28390, 15 stones/carat, 18 PDC's, 12 airways. Run new Christensen core barrel anti-jam assembly. |
| 1200 - 1230 | Lunch. |
| 1230 - 1314 | Finish tripping in hole with coring assembly. |
| 1314 - 1529 | Core run #158 from 679.24' - 689.19', Rec. 3.5', 84 min.. |
| 1529 - 1600 | Core run #159 from 689.19' - 694.55', Rec. 2.6', 13 min.. |
| 1600 - 1630 | Pick up core rod and secure rig. |

CORING: Average air rate: 622 SCFM
 Average vacuum rate: 1080 SCFM

REAMING: Average air rate: 1154 SCFM
 Average vacuum rate: 1235 SCFM

Ending Depth: Cored 694.55' Reamed 679.03' Drilled 0
Daily Footage: Cored 15.31' Reamed 20.03' Drilled 0

Drilling Rep: Richard Sowards, REECO
A/E Rep: David Putnam
Personnel On Site: 1-RSN, 2-USGS, 5-SMF, 9-REECO, 1-DOE, 2-VISITORS
Field Report Prepared By: David Putnam
Office Report Prepared By: Richard Wright

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 16, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3

Station: USW UZ N31

Drill Rig: CME-850

Activity: Reaming

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 15, 1992 (Rig Day 8)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|-----------------|---|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0840 | Labor meeting to elect blue hat safety representative. |
| 0840 - 0915 | Standby ready to work. No USGS representative on location. |
| 0915 - 1015 | Core run #23 from 65.99' - 71.01' (50 mins) 5.0' Rec. |
| 1015 - 1051 | Core run #24 from 71.01' - 74.97' (27 mins) 4.0' Rec. |
| 1051 - 1127 | Pull out of hole with coring assembly. Trip in hole with reaming assembly and Odex hammer. Rig up to ream. |
| 1127 - 1209 | Ream cycle #16 from 63.65' - 74.97' (42 mins). |
| 1209 - 1239 | Lunch. |
| 1239 - 1303 | Pull out of hole with reaming assembly. Trip in hole with coring assembly. Rerun bit RSN #35, a Longyear impregnated diamond. |
| 1303 - 1346 | Core run #25 from 74.97' - 79.54' (24 mins) 3.9' Rec. |
| 1346 - 1425 | Core run #26 from 79.54' - 84.54' (30 mins) 4.9' Rec. |
| 1425 - 1504 | Core run #27 from 84.54' - 89.54' (27 mins) 5.0' Rec. |
| 1504 - 1537 | Core run #28 from 89.54' - 94.54' (26 mins) 5.0' Rec. |
| 1537 - 1600 | Pull out of hole with coring assembly. Trip in hole with reaming assembly and Odex hammer. Rig up to ream. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 161 SCFM Reaming - 315 SCFM

| | | | |
|----------------|--------------|---------------|-----------|
| Ending Depth: | Cored 94.54' | Reamed 74.97' | Drilled 0 |
| Daily Footage: | Cored 28.55' | Reamed 11.32' | Drilled 0 |

Drilling Rep: Neal Walker, REECO

A/E Rep: James E. Anthony

Personnel On Site: 1-RSN; 4-REECO; 3-SMF; 1-USGS; 5-Visitors

Field Report Prepared By: James E. Anthony

Office Report Prepared By: James E. Anthony

| HOURS TEST DATE | CORE LOSS | DRILLING RATE (ft/hr) | | | FRAC FREQ (/ 5 ft) | | DEPTH | LITHOLOGY/ REMARKS |
|-----------------------|-------------------|--------------------------|----|-----|------------------------|-----|-------|--------------------|
| | | 20 | 70 | 120 | 50 | 100 | | |
| 5 | | 11.6 | | | | | | |
| 6 | 10.8/10.9 101% | 3.0 | | | 25 | | | |
| 7 | | 0.4 | | | | | | |
| 8 | | 1.3 | | | | | | |
| 9 | 9/9/92 | 2.8 | | | | | 30 | |
| 10 | 4.8/4.8 100% | 1.0 | | | 21 | | | |
| 11 | 9/10/92 | 3.8 | | | | | 35 | |
| 12 | | 3.3 | | | 29 | | | |
| 13 | | 1.6 | | | | | 40 | |
| 14 | | 0.2 | | | | | | |
| 15 | 9.4/9.8 103% | 3.4 | | | 39 | | | |
| 16 | 9/11/92 | 3.1 | | | | | 45 | |
| 17 | | 2.8 | | | 17 | | | |
| 18 | | 7.5 | | | 19 | | 50 | |
| 19 | | 8.4 | | | 5 | | 55 | |
| 20 | | 1.5 | | | | | 60 | |
| 21 | 9/14/92 | 7.0 | | | 14 | | | |
| 22 | 5.1/5.8 95% | 4.1 | | | | | 65 | |
| 23 | 9/15/92 | 6.0 | | | 21 | | | |
| | | | | | | | 70 | |

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RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 16, 1992
 Page: 1 of 1

Job Package No.: 92-03
 Station: UE-25 UZ16
 Drill Rig: LM300
 Activity: Rig repair

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum. 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 15, 1992 (Rig Day 70)

| <u>HOURS FROM - TO</u> | <u>OPERATIONS DESCRIPTION</u> |
|------------------------|--|
| 0800 - 0830 | Service and warm up equipment. |
| 0830 - 0915 | Change out 9-5/8" landing base plate. |
| 0915 - 0947 | Ream cycle # 55 from 639.16'. |
| 0947 - 1125 | Stop to repair hydraulic leak in transmission. |
| 1125 - 1155 | Resume ream cycle # 55. |
| 1155 - 1230 | Lunch. |
| 1230 - 1400 | Resume ream cycle # 55 to 659.00' and work tight hole. |
| 1400 - 1630 | Working on a hydraulic leak at the torque gauge. |

Note: The landing base plate is the fork that fits the 9-5/8" tool joint. This fork has been modified to prevent the accidental release of drill string.

CORING: Average air rate: 0
 Average vacuum rate: 0

REAMING: Average air rate: 1175 SCFM
 Average vacuum rate: 1247 SCFM

Ending Depth: Cored 679.24' Reamed 659.00' Drilled 0
 Daily Footage: Cored 0 Reamed 19.84' Drilled 0

Drilling Rep: Richard Sowards, REECO
 A/E Rep: Richard W. Wright & David Putnam
 Personnel On Site: 2-RSN, 2-USGS, 4-SMF, 9-REECO, DOE-3

Field Report Prepared By: David Putnam
 Office Report Prepared By: David Putnam

| RUNS DATES | DRILLING RATE (ft/hr) | FRAC FREQ (/ 5 ft) | DEPTH | LITHOLOGY / REMARK |
|------------|-----------------------|--------------------|-------|---------------------------------|
| | 0 | 0 | 635 | UE25uz#16 LITHOLOGY / REMARK |
| | 20 | 50 | 640 | |
| | 10 | 100 | 645 | |
| | 20 | 150 | 650 | |
| | 120 | 200 | 655 | |
| | 20 | 250 | 660 | |
| | 20 | 300 | 665 | |
| | 20 | 350 | 670 | |
| | 20 | 400 | 675 | |
| | 20 | 450 | 675 | |

| 148 | 149 | 150 | 151 | 152 | 154 | 155 | 156 |
|-----|-----|-----|-----|-----|-----|------|------|
| 4.8 | 4.2 | 4.8 | 4.8 | 3.6 | 4.1 | 10.2 | 10.2 |
| 18 | 25 | 18 | 18 | 15 | 5 | 2 | 33 |
| 635 | 640 | 645 | 650 | 655 | 660 | 665 | 670 |

| | | | | | |
|-----------------|---------|------------------|---------|----------------|---------|
| 11.9/9.8 82% | 8/26/92 | 15.7/15.3 97% | 8/27/92 | 1R 3/16.5 % | 9/14/92 |
|-----------------|---------|------------------|---------|----------------|---------|

| | | | | | |
|-----|-----|------|------|------|------|
| 2.4 | 2.4 | 13.4 | 13.4 | 10.2 | 10.2 |
|-----|-----|------|------|------|------|

| | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 635 | 640 | 645 | 650 | 655 | 660 | 665 | 670 | 675 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 635 | 640 | 645 | 650 | 655 | 660 | 665 | 670 | 675 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 635 | 640 | 645 | 650 | 655 | 660 | 665 | 670 | 675 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 635 | 640 | 645 | 650 | 655 | 660 | 665 | 670 | 675 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 635 | 640 | 645 | 650 | 655 | 660 | 665 | 670 | 675 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 635 | 640 | 645 | 650 | 655 | 660 | 665 | 670 | 675 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30

Date: September 15, 1992

Page: 1 of 1

Job Package No.: 92-03

Station: UE-25 UZ16

Drill Rig: LM300

Activity: Reaming

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum. 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 14, 1992 (Rig Day 69)

**HOURS
FROM - TO**

OPERATIONS DESCRIPTION

| | |
|-------------|---|
| 0800 - 1207 | Allison transmission mechanic on location. Repair transmission. |
| 1207 - 1217 | Core run #156. |
| 1217 - 1304 | Shut down rig because transmission overheated. Repair transmission. |
| 1304 - 1350 | Core run #156 from 673.41' - 676.42', Rec. 2.7', 43 min.. |
| 1350 - 1440 | Core run #157 from 676.42' - 679.24', Rec. 2.3', 36 min.. |
| 1440 - 1502 | Rig up to pull out of the hole with core rods. |
| 1502 - 1545 | Pull out of the hole with core rods. |
| 1545 - 1615 | Change out plate in rotary slips. |
| 1615 - 1630 | Shut down and secure rig. |

CORING: Average air rate: 432 SCFM
Average vacuum rate: 1179 SCFM

REAMING: Average air rate: NA
Average vacuum rate: NA

Ending Depth: Cored 679.24' Reamed 639.16' Drilled 0
Daily Footage: Cored 5.83' Reamed 0 Drilled 0

Drilling Rep: Richard Sowards, REECO

A/E Rep: Richard W. Wright

Personnel On Site: 2-RSN, 2-USGS, 2-SMF, 8-REECO, 4-Visitors

Field Report Prepared By: Richard W. Wright

Office Report Prepared By: Richard W. Wright

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 15 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N31
 Drill Rig: CME-850
 Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 14, 1992 (Rig Day 7)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|-----------------|--|
| 0800 - 0850 | Safety meeting, service and start up equipment. |
| 0850 - 0940 | Pull out of hole with coring assembly. Change out Odex hammer. Trip in hole with reaming assembly. Rig up to ream. |
| 0940 - 0956 | Check valve hung on hydraulic system. Bleed off pressure. Working OK. |
| 0956 - 1047 | Ream cycle #14 from 50.52' - 59.87' (49 mins). |
| 1047 - 1135 | Pull out of hole with Odex hammer. Trip in hole with coring assembly. Run bit RSN #33, Serial #2S27751, a Christensen carbonato, surface set, 15 stones/ct., 10 air courses 1/4"W x 3/16"D |
| 1135 - 1202 | Start core run #20. |
| 1202 - 1232 | Lunch. |
| 1232 - 1300 | Core run #20 from 59.87' - 60.87' (40 min.) Rec. 0.8'. |
| 1300 - 1326 | Pull out of hole with coring assembly. Take off RSN #33, pick up RSN #34, Serial #BL5632, a Huddy, Impregnated diamond bit with 5 open faced airways and 5 outside airways. Trip in hole. |
| 1326 - 1402 | Core run #21 from 60.87' - 63.65', (24 min.) Rec. 2.9'. |
| 1402 - 1444 | Pull out of hole with coring assembly (RSN #34 burned up). Trip in hole with reaming assembly and Odex hammer. Rig up to ream. |
| 1444 - 1500 | Ream cycle #15 from 59.87' - 63.65'. |
| 1500 - 1520 | Pull out of hole with Odex hammer. Trip in hole with coring assembly. Run new bit RSN #35, Serial #L96315, a Longyear, series 6, Impregnated diamond bit with a 5 row jagged face, 10 air courses each 5/64"W x 5/8"D. |
| 1520 - 1600 | Core run #22 from 63.65' - 65.99', (34 min.) Rec. 2.1'. |
| 1600 - 1630 | Shut down and secure rig. |
| | NOTE: Average air rates Coring - 245 SCFM Reaming - 312 SCFM |

| | | | |
|----------------|--------------|---------------|-----------|
| Ending Depth: | Cored 65.99' | Reamed 63.65' | Drilled 0 |
| Daily Footage: | Cored 6.12' | Reamed 13.13' | Drilled 0 |

Drilling Rep: Neal Walker, REECo
 A/E Rep: James E. Anthony
 Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 5-Visitors

Field Report Prepared By: James E. Anthony
 Office Report Prepared By: James E. Anthony

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/18/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|--|-------------------------------------|-------------------------------------|------------------------------|----------------------------------|---|
| 9/14-15/92 Las Vegas, NV (Alexis Park Hotel) | NWTRB SG&G Panel Meeting ** | TBD | Cooper (Hoffman-SAIC) | LANL | Update on volcanism studies. This topic was formerly planned for discussion at October NWTRB meeting. |
| 9/16/92 Field Locations TBD | NWTRB SG&G Field Trip ** | TBD | Cooper (Hoffman-SAIC) | LANL | |
| 9/17-18/92 LV/NTS/YM | NRC Site Visit: Midway Valley ** | Sullivan (Statton-M&O) | Bjerstedt (LeRoy-M&O) | M&O USGS | Discuss Study Plan 8.3.1.17.4.2, preliminary results, and plans for future work, and Tour Midway Valley. |
| 9/23-25/92 Bethesda, MD | ACNW 46th Meeting | | Gil (LeRoy-M&O) | | Discuss with EPA recent consideration of C-14 release limits, progress report by NRC's LLWM division, proposed guide on 10CFR20 ALARA criteria. |
| 9/30- 10/1/92 (Las Vegas, NV) | NWTRB Dry Run | D. Harrision | Cooper (Hoffman-SAIC) | M&O LLNL PNL | |

BOLD INDICATES REVISIONS AND NEW INFORMATION
**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/18/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|---|-------------------------------------|------------------------------|----------------------------------|---|
| 10/14-15/92 Las Vegas, NV (Plaza Suite Hotel) | NWTRB Full Board ** | D. Harrison | Cooper (Hoffman-SAIC) | M&O LLNL PNL | Source term; 1) Concept and release mechanisms, 2) spent fuel testing, 3) PA and design implications. |
| 10/16/92 Las Vegas, NV | NWTRB Yucca Mountain Site Tour ** | | Cooper (Hoffman-SAIC) | | |
| 10/20/92 Las Vegas, NV | ACNW WG on Human Intrusion ** | | Gil (LeRoy-M&O) | | Discuss methodologies for assessment of potential for natural resources at YM, and relationship between such resources and potential for human intrusion. |
| 10/21/92 Las Vegas, NV | ACNW 47th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD. |
| 10/22/92 | ACNW Yucca Mountain and NTS Tours | | Gil (LeRoy-M&O) | | Agenda TBD. |
| 10/23/92 | ACNW GIS Tour | | Gil (LeRoy-M&O) | | Tour will take place in the morning only. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

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WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/18/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|--|--|-------------------------------------|------------------------------|----------------------------------|--|
| | | | | | Discuss methods and results of DOE PACE, TSPA, and NRC IPA. |
| 10/30/92 San Antonio, TX (TENTATIVE) | NRC TE: CNWRA Functional Analysis of 10CFR60 ** | | Bjerstedt (LeRoy-M&O) | M&O | Discuss CNWRA activities related to systems engineering. |
| 11/4-6/92 Denver, CO (TENTATIVE) | NWTRB SG&G Panel Meeting ** | | Cooper (Hoffman-SAIC) | M&O | Discuss ESF and repository design. |
| 11/16-17/92 Bethesda, MD | ACNW 48th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD |
| 11/17/92 Albuquerque, NM | NRC TE: Volcanism ** | Cooper (Jerez-M&O) | Bjerstedt (LeRoy-M&O) | M&O LANL | Discuss DOE volcanism studies as detailed in LANL report. |
| 11/18/92 Bethesda, MD | ACNW WG Climate ** | | Gil (LeRoy-M&O) | | Discuss the potential for climate changes in Southern Basin and Range and the impact on natural processes affecting PA of potential repository at YM. Original scheduled 11/19/91, this has been rescheduled from 4/22/92. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

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WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/18/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|---|---|------------------------------|----------------------------------|---|
| Date and Location TBD Rockville, MD | Interaction Planning Meeting ** | Bjerstedt (LeRoy-M&O) | Bjerstedt (LeRoy-M&O) | M&O | Discuss/plan DOE/NRC interactions for first half 1993. Previously scheduled 11/18/92. |
| 11/18-20/92 Albuquerque, NM | DOE Workshop on Expert Judgment ** | Dyer/Boak (Yunker-M&O, Van Luik-M&O, Weaver-M&O) | Simmons (Hoffman-SAIC) | M&O | Examine DOE's use of expert judgment for YMP, learn how other projects have used expert judgment, make recommendations for future use, fulfill NWTRB recommendation to hold workshop. |
| 12/14-15/92 Rockville, MD | NRC TE: Total System Performance Assessment ** | Boak (Pahwa-M&O) | Bjerstedt (LeRoy-M&O) | M&O SNL PNL | |
| 12/16/92 Bethesda, MD | ACNW WG on PA - Phase 2 HLW Interactive PA by NRC ** | Boak (Van Luik-M&O) | Gil (LeRoy-M&O) | M&O SNL | Will discuss progress of Phase 2 PA effort. Also will hear briefing from DOE on status of TSPA. |
| 12/17-18/92 Bethesda, MD | ACNW 49th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

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WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/18/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|--|-------------------------------------|------------------------------|----------------------------------|---|
| Delayed to early 1993 Albuquerque, NM | WIPP Roundtable discussion - NRC observation ** | Boak (Van Luik-M&O) | Bjerstedt (LeRoy-M&O) | M&O SNL PNL | NRC staff observe interaction between YMPO PA and WIPP PA. Previously scheduled 10/27/92. |
| Delayed to early 1993. Carlsbad, NM | Tour of WIPP Site | Boak (Van Luik-M&O) | Bjerstedt (LeRoy-M&O) | M&O | Previously scheduled 10/28/92. |
| 1/5-6/93 Arlington, VA | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | M&O systems update and ESF and respository design follow-up. |
| 2/93 or 3/93 TBD | NWTRB HG&G Panel Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 4/20-23/93 Reno, NV | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 6/1/93 TBD | NWTRB International Trip | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 7/12-15/93 Denver, CO | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/18/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|------------------------------|-----------------------------------|-------------------------------------|------------------------------|----------------------------------|-----------------|
| 10/19-22/93 Las Vegas, NV | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

**DRILLING, TRENCHING, AND TEST PIT ACTIVITIES
9/18/92**

| <u>DESIGNATION</u> | <u>PLANNED START DATE</u> | <u>PLANNED END DATE</u> | <u>BACKFILL DATE</u> | <u>YMPO SITE CONTACT</u> | <u>COMMENTS</u> |
|---|---------------------------|-------------------------|----------------------|--------------------------|---|
| Midway Valley Investigations | 7/22/92 | 8/7/92 | N/A | Sullivan | Four (one additional is optional) gravity and Magnetic evaluation lines going East-West across Midway Valley were completed. |
| Soil and Rock Properties Test Pits (Phase II) | 8/17/92 | 10/31/92 | TBD | Williams | Excavate 41 test pits for engineering properties of planned roads, one each fields, and concrete aggregate sources. Data for design of ESF. |
| Fran Ridge Test Pit No. 1 | 8/24/92 | 9/15/92 | N/A | Girdley | Bedrock excavation in Topopah by controlled blasting. Fracture network mapping will be undertaken. |
| Quaternary Faulting - Site Area | 8/17/92 | 8/22/92, Complete | TBD | Sullivan | Six trenches across Quaternary faults were excavated for detailed mapping. Four pavement sites were cleared. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

DRILLING, TRENCHING, AND TEST PIT ACTIVITIES

9/18/92

| <u>DESIGNATION</u> | <u>PLANNED START DATE</u> | <u>PLANNED END DATE</u> | <u>BACKFILL DATE</u> | <u>YMPO SITE CONTACT</u> | <u>COMMENTS</u> |
|--|---------------------------|-------------------------|----------------------|--------------------------|--|
| Volcanic Centers Soil Test and Sample Collection | 9/2/92 | 9/3/92 | 9/3/92 | Cooper | Continue examination of soil development on volcanic rocks to test results of chronology studies. Collect samples of volcanic rocks for petrology studies. This activity began July 1991 and occurs periodically. This was successfully completed. |
| Lathrop Wells Cinder Cone Volcanic Trenching | 9/8/92 | 9/16/92 | 9/16/93 | Cooper | Continuation of the volcanic studies. |
| Unsaturated Zone Borehole No. 16 | 5/27/92 | 3/24/93 | N/A | Long | Unsaturated zone site characterization and vertical seismic profiling. |
| Neutron-Access Boreholes Phase II (12 boreholes) | 8/3/92 | TBD | N/A | Girdley | Core taken from these holes will be used by USGS for determination of moisture content and to construct tritium profiles. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**



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

WBS 1.2.3
QA: N/A

SEP 22 1992

J. Russell Dyer, YMP, NV
Winfred A. Wilson, YMP, Mercury, NV, M/S 717

FIELD TEST COORDINATOR'S REPORT FOR THE WEEK ENDING SEPTEMBER 18, 1992

UZ-16

Scope of Activity: A borehole approximately 1700 feet in depth will be drilled using the LM-300 drilling system. The primary purpose of the hole will be for vertical seismic profile testing, although other tests such as air permeability, hydrogeochemistry, and matrix hydrologic properties are also being planned. Drilling is scheduled from May through December 1992, following pad construction in March 1992.

Status as of September 18, 1992: The Transmission was installed in the LM-300 on September 14 and coring was resumed. Some additional down time was caused by minor maintenance and repair; however, coring continued from 673.41 to 719.3 feet and the borehole was reamed from 679.03 feet to 697 feet. An increase in fractures resulted in low core recoveries during the last ten feet of coring.

NEUTRON-ACCESS BOREHOLES

Scope of Activity: Approximately 24 shallow boreholes will be drilled/cored for neutron logging by the U.S. Geological Survey (USGS) in order to evaluate natural infiltration. Core taken from these holes will be used by USGS for determination of moisture content and to construct tritium profiles. The drilling operation utilizes an Odex drilling system, which produces HQ core and a cased hole having a diameter of approximately six inches. The drilling program is being implemented in two phases, each consisting of 12 boreholes that will take several months to complete.

Status as of September 18, 1992: Borehole USW UZN-31 continues to be drilled with the CME 850 drill rig. It is the first of a pair of holes adjacent to each other in Split Wash near the trace of the Ghost Dance fault. Sampling continued this week primarily in the Shardy Base and Bedded Tuff units. Core was taken from the interval 59.87 to 144.55 feet, and the borehole was advanced from 50.52 to 144.55 feet. Samples became moist at 95.54 feet. SF₆ tracer gas was injected during drilling operations.

QUATERNARY FAULTING WITHIN THE SITE AREA INVESTIGATIONS

Scope of Activity: Pavements and trenches will be excavated to provide exposures of Quaternary deposits and faults for mapping by geologists from the USGS as described in Study Plan 8.3.1.17.4.6 Quaternary Faulting in the Site Area. Planned activities include excavation of new trenches and modification of existing trenches on the Windy Wash fault, Solitario Canyon fault, and Stagecoach Road fault, and modification of existing exposures of the Paintbrush Canyon fault west of Busted Butte in the sand ramps by developing pavements.

Status as of September 18, 1992: Geologic mapping, sampling, and interpretation continues on trench excavations and pavement clearings completed during previous weeks. Trenches and pavement clearings associated with Quaternary Fault studies, including those at Busted Butte, Midway Valley, and Armagosa Valley, were visited by the U.S. Nuclear Regulatory Commission on September 17-18, 1992.

SOIL AND ROCK PROPERTIES

Scope of Activity: Objectives of this investigation are to characterize the soil and rock conditions that will influence or be influenced by the construction of the Exploratory Studies Facility surface and subsurface access facilities. This activity is comprised of a total of 32 test pits and one drill hole (NRG-1). Ongoing Phase II activities include 41 additional test pits and pavement clearing at NRG-1.

Status as of September 18, 1992: Excavation of 41 Phase II test pits commenced on September 15, 1992. During this reporting period, 21 of these pits were excavated. Sampling and geologic description/interpretation of the excavated soils physical properties is concurrently being performed.

CHARACTERIZATION OF STRUCTURAL FEATURES IN THE SITE AREA

Scope of Activity: Objectives of this investigation are to conduct prototype work for development of equipment and techniques for shaft mapping in the Exploratory Studies Facility. Developmental work is to be completed in an enlarged and deepened circular test pit on the east side of Fran Ridge. The area around the pit disturbed during the original excavation will be cleaned to the rock surface for use in pavement studies for Surface Fracture Network Studies.

Status as of September 18 1992: Clearing of pavement at Fran Ridge commenced on September 8, 1992 and is ongoing. The pavement clearing is being completed with hand labor and a blowpipe supplying a jet of air and water. Equipment supporting clearing operations included a front end loader, backhoe, air compressor, and water truck.

SEP 22 1992

Multiple Addressees

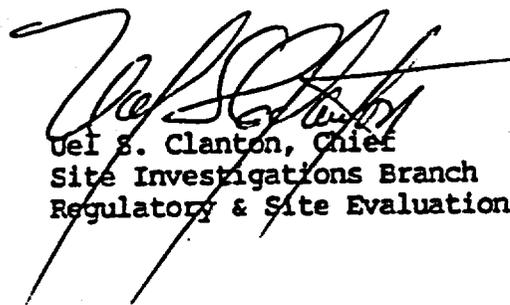
-3-

VOLCANISM EXCAVATIONS

Scope of Activity: Test pits and trenches will be excavated at the Lathrop Wells Volcanic Center and at the Cima volcanic field in order to test alternative models of eruptive histories of cinder cone volcanic activity. The excavations will provide exposures of volcanic materials (lava flows, pyroclastic deposits) and soils for examination and collection of samples. Planned activities include collection of samples for age determinations by multiple methods, description and collection of samples for evaluation of soil development on volcanic units, exposure of contact relations to aid stratigraphic studies for mapping of volcanic centers, and collection of samples for petrologic analysis.

Status as of September 18, 1992: Examination and interpretation of geologic conditions continued on the excavation completed on the north flank of the Lathrop Wells cone. On September 16, 1992, the trench was shown to the Nuclear Waste Technical Review Board on a tour in conjunction with their volcanism meeting.

If you have any questions, please contact me at 794-7943.



Uel S. Clanton, Chief
Site Investigations Branch
Regulatory & Site Evaluation Division

RSED:KJS-5738



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

WBS 1.2.3.5
QA: N/A

SEP 24 1992

Carl H. Johnson, State of Nevada, Carson City, NV
Phillip Niedzielski-Eichner, Nye County, Chantilly, VA
Dennis A. Bechtel, Clark County, Las Vegas, NV
Albert C. Douglas, City of Las Vegas, Las Vegas, NV
Philip S. Justus, NRC, Las Vegas, NV

DAILY OPERATIONS REPORTS AND WEEKLY INTERACTIONS CALENDAR

Enclosed for your information are copies of the Daily Operations Reports for Yucca Mountain Site Characterization Project drill holes USW UZ N31, UE-25 UZ16, and UE-25 NRG-1 (enclosure 1). These reports were prepared by Raytheon Services Nevada and cover September 8-11, 1992.

A copy of the Weekly Interactions Calendar (enclosure 2) is enclosed for your information. It includes a section providing the status of boreholes, trenches, and test pits.

A copy of the field test coordinator's report (enclosure 3) summarizing activities of the previous week and a forecast of the activities planned for the current week is also included for your information.

If you need additional information regarding these reports, please contact Uel S. Clanton at (702) 794-7943.

RSED:USC-5701

Russell M. Dyer
Russell M. Dyer, Director
Regulatory & Site Evaluation Division

Enclosures:

1. Daily Operations Reports
2. Weekly Interactions Calendar
3. Field Test Coordinator's Reports

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 14, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N31
 Drill Rig: CME-850
 Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 11, 1992 (Rig Day 6)

**HOURS
FROM - TO**

OPERATIONS DESCRIPTION

| | |
|-------------|---|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0840 | Run inner barrel. Tighten bolts on rotating head because of air leaks. |
| 0840 - 1032 | Core run #16 from 42.59' - 47.56' (95 min) Rec. 4.9'. |
| 1032 - 1154 | Core run #17 from 47.56' - 50.52' (64 min) Rec. 2.9'. |
| 1154 - 1200 | Pull out of hole with coring assembly. |
| 1200 - 1230 | Lunch. |
| 1230 - 1251 | Trip in hole with Odex hammer. Rig up to ream. |
| 1251 - 1345 | Ream cycle #13 from 40.61' - 50.52'. |
| 1345 - 1411 | Pull out of hole with Odex hammer and trip in hole with same diamond bit #RSN 34. |
| 1411 - 1501 | Core run #18 from 50.52' - 55.53', (40 min) Rec. 5.0'. |
| 1501 - 1550 | Core run #19 from 55.53' - 59.87', (31 min) Rec. 4.1'. |
| 1550 - 1600 | Transmission overheated, allow to cool. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 225 SCFM Reaming - 323 SCFM

| | | | |
|----------------|--------------|---------------|-----------|
| Ending Depth: | Cored 59.87' | Reamed 50.52' | Drilled 0 |
| Daily Footage: | Cored 17.28' | Reamed 9.91' | Drilled 0 |

Drilling Rep: Neal Walker, REECo
 A/E Rep: James E. Anthony
 Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 1-DOE; 8-Visitors

Field Report Prepared By: James E. Anthony
 Office Report Prepared By: James E. Anthony and Richard W. Wright

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30

Date: September 14, 1992

Page: 1 of 1

Job Package No.: 92-03

Station: UE-25 UZ16

Drill Rig: LM300

Activity: Repairing rig transmission.

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum. 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 11, 1992 (Rig Day NA)

**HOURS
FROM - TO**

OPERATIONS DESCRIPTION

0800 - 1045

No coring or reaming activity. Wait on Allison transmission mechanic.

1045 - 1630

Mechanic will not come today. Due on Monday. Shut down; waiting on parts to repair the transmission.

CORING: Average air rate: NA
Average vacuum rate: NA

REAMING: Average air rate: NA
Average vacuum rate: NA

Ending Depth: Cored 673.41' Reamed 639.16' Drilled 0
Daily Footage: Cored 0 Reamed 0 Drilled 0

Drilling Rep: Richard Sowards, REECO

A/E Rep: Curtis Clark

Personnel On Site: 1-RSN, 0-USGS, 0-SMF, 8-REECO

Field Report Prepared By: Curtis Clark
Office Report Prepared By: Curtis Clark

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 11, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N31
 Drill Rig: CME-850
 Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 10, 1992 (Rig Day 5)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|--|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0845 | Check depths and compare core rod and drill rod tallies. |
| 0845 - 0953 | Core run #11 from 33.19' - 35.93' (44 min.) Rec. 2.8'. |
| 0953 - 1113 | Core run #12 from 35.93' - 39.54' (66 min.) Rec. 4.0'. |
| 1113 - 1200 | Core run #13 from 39.54' - 40.54' (38 min.) Rec. 0.9'. |
| 1200 - 1230 | Lunch. |
| 1230 - 1310 | Pull out of hole with core rods. Steel line measure core rods and BHA. Trip in hole with same bit. |
| 1310 - 1347 | Core run #14 from 40.54' - 40.61' (28 min.) Rec. 0.1'. |
| 1347 - 1419 | Pull out of hole for ream cycle. Trip in hole with Odex hammer and drill rods. |
| 1419 - 1500 | Ream cycle #12 from 32.17' - 40.61'. |
| 1500 - 1518 | Pull out of hole with Odex hammer, trip in hole with core bit RSN #34 (Diamond - same bit pulled prior to ream cycle). |
| 1518 - 1600 | Core run #15 from 40.61' - 42.59' (35 min.) Rec. 2.0'. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 199 SCFM Reaming - 300 SCFM

NOTE: On core run #12, 0.39' additional core was recovered. A resolution meeting was held.

| | | | |
|----------------|--------------|---------------|-----------|
| Ending Depth: | Cored 42.59' | Reamed 40.61' | Drilled 0 |
| Daily Footage: | Cored 9.40' | Reamed 8.44' | Drilled 0 |

Drilling Rep: Neal Walker, REECo
 A/E Rep: James E. Anthony
 Personnel On Site: 1-RSN; 4-REECo; 4-SMF; 2-USGS; 1-DOE; 8-Visitors

Field Report Prepared By: James E. Anthony
 Office Report Prepared By: James E. Anthony

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
Date: September 11, 1992
Page: 1 of 1

Job Package No.: 92-03

Station: UE-25 UZ16

Drill Rig: LM300

Activity: Repairing rig transmission.

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 10, 1992 (Rig Day NA)

| <u>HOURS FROM - TO</u> | <u>OPERATIONS DESCRIPTION</u> |
|------------------------|---|
| 0800 - 1100 | No coring or reaming activity. Wait on Allison transmission mechanic. |
| 1100 - 1200 | Work on transmission. Gear shifting valve defective; to be replaced tomorrow. |
| 1200 - 1230 | Lunch |
| 1230 - 1630 | Shut down; waiting on parts. |

CORING: Average air rate: NA
Average vacuum rate: NA

REAMING: Average air rate: NA
Average vacuum rate: NA

| | | | |
|----------------|---------------|----------------|-----------|
| Ending Depth: | Cored 673.41' | Reamed 639.16' | Drilled 0 |
| Daily Footage: | Cored 0 | Reamed 0 | Drilled 0 |

Drilling Rep: Richard Sowards, REECO

A/E Rep: Curtis Clark

Personnel On Site: 1-RSN, 1-USGS, 0-SMF, 8-REECO

Field Report Prepared By: Curtis Clark
Office Report Prepared By: Curtis Clark

TUCA MOUNTAIN SITE CHARACTERIZATION PROJECT PRELIMINARY FIELD COMPOSITE COREHOLE LOG

COREHOLE ID: USW UZN-31

STUDY PLAN NO: _____

CORE SIZE: _____

DRILL DATES: 9/3/92-

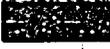
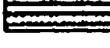
GROUND ELEV: _____

COORDINATES: N: _____

E: _____

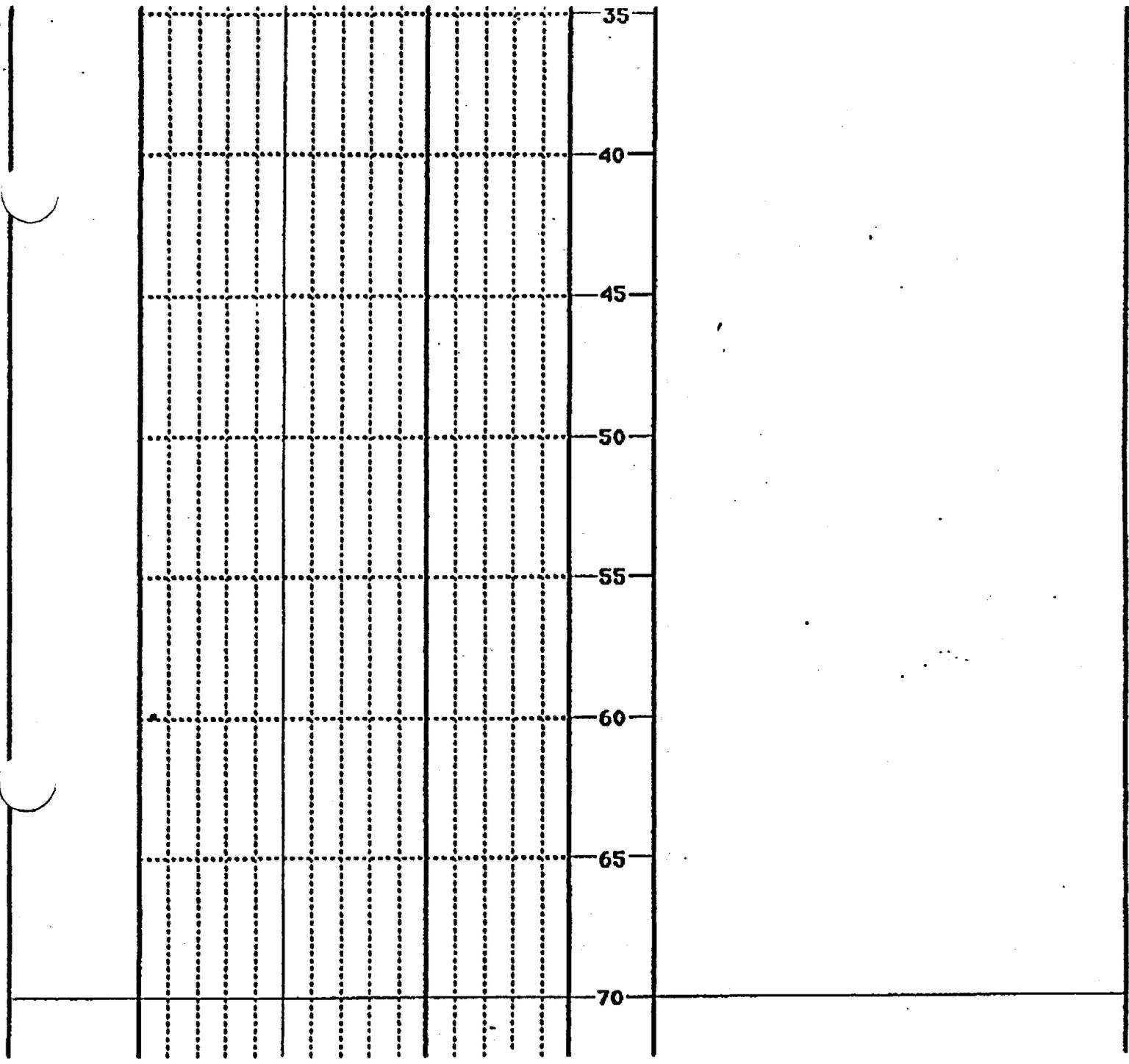
TOTAL DEPTH: _____

ANGLE FROM VERT: _____ BEARING: _____

-  ALLUVIUM
-  NON-WELDED
-  PARTIALLY WELDED
-  DENSELY WELDED
-  VITROPHYRE
-  BEDDED TUFF

Logging by Drilling Support Division, Drilling Support and Sample-Management Dept, T&MSS

| RUNS DATES BITS | CORE LOSS | DRILLING RATE (ft/hr) | | | FRAC FREQ (/ 5 ft) | | DEPTH GRAPHIC LOG | Page <u>1</u> of _____ |
|-----------------------|------------------|--------------------------|-----|-------|-----------------------|----|--|---|
| | | 0 | 10 | 20 | 0 | 50 | | |
| DC-1 | 9/3/92 | | | 102.0 | | |  | <p>0.0-15.1 Alluvium: light brown; pebbles and cobbles of Tiva Canyon, light gray, subrounded and angular.</p> <p>15.1-XXXX Tuff, ashflow, light brownish gray moderately to densely welded; 5-10% white pumice frags, 10% phenocrysts of plagioclase and sanidine, clay mineralization on fractures.</p> |
| DC-2 | | | | 115.8 | | | | |
| DC-3 | | | | 32.2 | | | | |
| DC-5 | 95% 7.0/6.7 | | | 60.0 | | | | |
| DC-6 | 9/4/92 | | | 73.2 | | | | |
| DC-7 | | | | 120 | | | | |
| DC-8 | | | | 52.8 | | | | |
| DC-9 | | | | 60 | | | | |
| DC-10 | | | | 13.2 | | | | |
| DC-11 | | | | 60 | | | | |
| DC-12 | | | | 73.8 | | | | |
| DC-13 | | | | 17.4 | | | | |
| 1 | 17.6/17.1 97% | 4.2 | | | 11 | | | |
| 2 | | 4.7 | | | | | | |
| 3 | | 2.4 | | | | 20 | | |
| 4 | | 1.8 | | | 17 | | | |
| | | 1.6 | | | | 25 | | |
| 6 | 109/108 101 | 3.0 | | | 25 | | | |
| 7 | 9/9/92 | 0.4 | 1.3 | | | | | |



RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
 Date: September 10, 1992
 Page: 1 of 1

Job Package No.: 92-03

Station: UE-25 UZ16

Drill Rig: LM300

Activity: Installing rig transmission.

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum. 3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 9, 1992 (Rig Day NA)

**HOURS
FROM - TO**

OPERATIONS DESCRIPTION

0800 - 1630

No coring or reaming activity. Install Allison transmission and test transmission. Unable to shift to 4th, 5th, or 6th gear without manual assistance. Shut down and secure rig.

NOTE: Allison mechanic to be on location 9/10/92.

CORING: Average air rate: NA
 Average vacuum rate: NA

REAMING: Average air rate: NA
 Average vacuum rate: NA

| | | | |
|-----------------------|----------------------|-----------------------|------------------|
| Ending Depth: | Cored 673.41' | Reamed 639.16' | Drilled 0 |
| Daily Footage: | Cored 0 | Reamed 0 | Drilled 0 |

Drilling Rep: Richard Sowards, REECO
A/E Rep: James E. Anthony & Curtis Clark
Personnel On Site: 2-RSN, 2-USGS, 4-SMF, 12-REECO

Field Report Prepared By: James E. Anthony
Office Report Prepared By: James E. Anthony

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 10, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N31
 Drill Rig: CME-850
 Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 9, 1992 (Rig Day 4)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|--|
| 0800 - 0830 | Service and start up equipment. |
| 0830 - 0901 | Core run # 7 from 28.43' - 28.63' (23 min.) Rec. 0.2'. |
| 0901 - 0924 | Core run # 8 from 28.63' - 28.92' (14 min.) Rec. 0.3'. |
| 0924 - 1003 | Pull out of hole with core rods to change core bit. Remove RSN #30, Diamond. Make up RSN #33, SN# 2S27751, new, Christensen diamond, 4-6 stones per carat, with 10 airways. Trip in hole. Tag out of gauge hole @ 21.49'. Pull out of hole for ream cycle. |
| 1003 - 1035 | Ream cycle #10 from 21.49' - 28.92'. |
| 1035 - 1045 | Pull out of hole with Odex hammer, trip in hole with core bit RSN #33. |
| 1045 - 1200 | Core run # 9 from 28.92' - 32.20' (71 min.) Rec. 3.3'. |
| 1200 - 1230 | Lunch |
| 1230 - 1400 | Core run # 10 from 32.20' - 33.19' (60 min.) Rec. 1.0'. |
| 1400 - 1438 | Pull out of hole with core rods to change core bit. Remove RSN #33, Diamond, Make up RSN #34, SN # BL5632, Huddy impregnated diamond bit. Trip in hole with Odex hammer. |
| 1438 - 1530 | Ream cycle #11 from 28.92' - 32.17'. |
| 1530 - 1600 | Change out core barrel and trip in hole with core rods. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 417 SCFM Reaming - 353 SCFM

| | | | |
|----------------|--------------|---------------|-----------|
| Ending Depth: | Cored 33.19' | Reamed 32.17' | Drilled 0 |
| Daily Footage: | Cored 4.76' | Reamed 10.68' | Drilled 0 |

Drilling Rep: Neal Walker, REECo
 A/E Rep: Richard W. Wright
 Personnel On Site: 1-RSN; 4-REECo; 3-SMF; 1-USGS; 4-Visitors

Field Report Prepared By: Richard W. Wright
 Office Report Prepared By: Richard W. Wright

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 9, 1992
 Page: 1 of 1

Job Package No.: 92-2
 Station: UE-25 NRG-1, North Portal Ramp Borehole
 Drill Rig: CME-550
 Activity: Final Report

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with HQ-3 and/or NQ-3 wireline Coring system & inject SF₆ tracer gas to a total depth of ±150'. 3) Remove Odex casing except 10' & install Cal-Seal surface plug. 7) Run geophysical logs. 8) Demobilize equipment. 9) Prepared final location and elevation survey.

REPORT FOR: September 8, 1992 (Rig Day 8)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|--|
| 0800 - 1100 | Move in CME 550 and rig up equipment. |
| 1100 - 1200 | Trip in hole with 4-1/4" hammer drill. Tag bridge @ 31.97'. Drill through bridge and push debris down hole and drill out to 84.64'. |
| 1200 - 1230 | Lunch |
| 1230 - 1248 | Drill debris to 85.12'. |
| 1248 - 1302 | Trip out of hole with drill rods and hammer bit. |
| 1302 - 1345 | Trip in hole with 3-1/2" tri-cone bit. Tag bridge at 111.50'. Drill out bridge and continue running in hole. Tag fill at 141.87'. Drill on fill to 141.92', no more progress. Contacted Dennis Williams with DOE/RSED, given permission to terminate operation. Will document with RSN Record of Verbal Communication. |
| 1345 - 1415 | Pull out of hole laying down drill rods. |
| 1415 - 1430 | Shut down and secure rig. |

NOTE: Last report until work resumes.

| | | | |
|----------------|--------------|--------------|-----------|
| Ending Depth: | Cored 150.12 | Reamed 85.12 | Drilled 0 |
| Daily Footage: | Cored 0 | Reamed 0 | Drilled 0 |

Drilling Rep: Richard Sowards, REECo
 A/E Rep: James E. Anthony
 Personnel On Site: 1-RSN; 7-REECo

Field Report Prepared By: James Anthony
 Office Report Prepared By: James Anthony

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30 hrs
 Date: September 9, 1992
 Page: 1 of 1

Job Package No.: 91-9, Revision 3
 Station: USW UZ N31
 Drill Rig: CME-850
 Activity: Coring

Objectives: 1) Mobilize drill rig & drilling system. 2) Continuous core with wire line coring system and inject SF₆ tracer gas to a total depth of approximately ±180'. 3) Ream down core track while coring with 6-inch bit & 5.5-inch O.D. Odex steel casing. 4) Demobilize equipment. 5) Prepared final location and elevation survey.

REPORT FOR: September 8, 1992 (Rig Day 3)

| HOURS FROM - TO | OPERATIONS DESCRIPTION |
|--------------------|---|
| 0800 - 0830 | Safety meeting |
| 0830 - 0850 | Service and Start up Equipment |
| 0850 - 0925 | Core run # 2 from 17.58' - 19.71' (27 min.) Rec. 1.8'. |
| 0925 - 1018 | Core run # 3 from 19.71' - 21.49' (46 min.) Rec. 2.2'. |
| 1018 - 1043 | Pull out of hole with core rods, trip in hole with Odex hammer. |
| 1043 - 1112 | Ream cycle #9 from 15.11' - 21.49'. |
| 1112 - 1129 | Pull out of the hole with the Odex hammer, change bits, pull bit RSN #30, Diamond, trip in hole with bit RSN #31, Strata-Pak. |
| 1129 - 1200 | Core run # 4 |
| 1200 - 1230 | Lunch |
| 1230 - 1334 | Core run # 4 from 21.49' - 24.51' (99 min.) Rec. 3.0'. |
| 1334 - 1454 | Core run # 5 from 24.51' - 26.42' (71 min.) Rec. 1.9'. |
| 1454 - 1508 | Pull out of hole with core rods to change core bit. Pull RSN #31, Strata-Pak, trip in hole with RSN# 30, Diamond. |
| 1508 - 1600 | Core run # 6 from 26.42' - 28.43' (38 min.) Rec. 2.0'. |
| 1600 - 1630 | Shut down and secure rig. |

NOTE: Average air rates
 Coring - 465 SCFM Reaming - 288 SCFM

| | | | |
|----------------|--------------|---------------|-----------|
| Ending Depth: | Cored 28.43' | Reamed 21.49' | Drilled 0 |
| Daily Footage: | Cored 10.85' | Reamed 6.28' | Drilled 0 |

Drilling Rep: Neal Walker, REECo
 A/E Rep: Richard W. Wright
 Personnel On Site: 1-RSN; 4-REECo; 4-SMF; 1-USGS; 3-Visitors

Field Report Prepared By: Richard W. Wright
 Office Report Prepared By: Richard W. Wright

RAYTHEON SERVICES NEVADA
DAILY OPERATIONS REPORT
YUCCA MOUNTAIN PROJECT

Report Time: 7:30
Date: September 9, 1992
Page: 1 of 1

Job Package No.: 92-03

Station: UE-25 UZ16

Drill Rig: LM300

Activity: Installing rig transmission.

Objectives: 1) Mobilize drill rig. 2) Continuous core/drive sample from ground level to 50' minimum.
3) Vacuum drill 22 inch hole and set 16" OD casing to total depth. 4) Cement casing to surface. 5) Continuously core and ream to 1663'. 6) Prepare final location and elevation survey. 7) Install wellhead box

REPORT FOR: September 8, 1992 (Rig Day NA)

HOURS
FROM - TO

OPERATIONS DESCRIPTION

0800 - 1630

No coring or reaming activity. Rig is down for repairs. Replacement transmission arrived on location. Mounted transmission.

CORING: Average air rate: NA
Average vacuum rate: NA

REAMING: Average air rate: NA
Average vacuum rate: NA

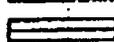
Ending Depth: Cored 673.41' Reamed 639.16' Drilled 0
Daily Footage: Cored 0 Reamed 0 Drilled 0

Drilling Rep: Richard Sowards, REECO
A/E Rep: N/A
Personnel On Site: NA

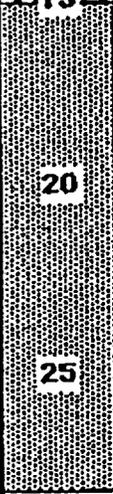
Field Report Prepared By: James E. Anthony
Office Report Prepared By: James E. Anthony

YULLA MOUNTAIN SITE CHARACTERIZATION PROJECT PRELIMINARY FIELD COMPOSITE COREHOLE LOG

COREHOLE ID: USV UZH-31
 STUDY PLAN NO: _____
 CORE SIZE: _____
 DRILL DATES: 9/3/92-
 GROUND ELEV: _____
 COORDINATES: N: _____
 E: _____
 TOTAL DEPTH: _____
 ANGLE FROM YERT: _____ BEARING: _____

-  ALLUVIUM
-  NON-WELDED
-  PARTIALLY WELDED
-  DENSELY WELDED
-  VITROPHYRE
-  BEDDED TUFF

Logging by Drilling Support Division, Drilling Support and Sample Management Dept, T&MSS

| RUNS DATES BITS | CORE LOSS | DRILLING RATE (ft/hr) | | FRAC FREQ (/ 5 ft) | | DEPTH GRAPHIC LOG | Page <u>1</u> of <u> </u> |
|-----------------------|------------------|--------------------------|-------|------------------------|---------|---|--|
| | | 0 | 10 | 20 | 0 | | |
| DC-1 | 9/3/92 | | 102.0 | | |  | 0.0-15.1 Alluvium: light brown; pebbles and cobbles of Tiva Canyon, light gray, subrounded and angular. |
| DC-2 | | | 115.8 | | NO DATA | | |
| DC-3 | | 37.2 | | | | | |
| DC-4 | | 60.0 | | | | | |
| DC-5 | 95% 7.0/6.7 | | 102.0 | | | | |
| DC-6 | 9/4/92 | | 73.2 | 120 | | | |
| DC-7 | | | | | | | |
| DC-8 | | | 52.8 | | | | |
| DC-9 | | | 60 | | | | |
| DC-10 | | | | 13.2 | | | |
| DC-11 | | | 60 | | | | |
| DC-12 | | | 73.8 | | | | |
| DC-13 | | | 17.4 | | | | |
| 1 | 17.6/17.1 97% | 4.2 | | | 11 |  | 15.1-XX Tuff, Ashflow, light brownish gray, moderately to densely welded; 5-10% pumice frags, white, 10% phenocrysts of plagioclase and sanidine, clay mineralization on fractures. |
| 2 | | 4.7 | | | | | |
| 3 | | 2.4 | | | | | |
| 4 | | 1.8 | | | 17 | | |
| | | 1.6 | | | | | |
| 6-109/108 101 | | 3 | | | 25 | | |

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/11/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|--|--|-------------------------------------|------------------------------|----------------------------------|---|
| 9/14-15/92 Las Vegas, NV (Alexis Park Hotel) | NWTRB SG&G Panel Meeting ** | TBD | Cooper (Hoffman-SAIC) | LANL | Update on volcanism studies. This topic was formerly planned for discussion at October NWTRB meeting. |
| 9/16/92 Field Locations TBD | NWTRB SG&G Field Trip ** | TBD | Cooper (Hoffman-SAIC) | LANL | |
| 9/17-18/92 LV/NTS/YM | NRC Site Visit: Midway Valley ** | Sullivan (Statton-M&O) | Bjerstedt (LeRoy-M&O) | M&O USGS | Discuss Study Plan 8.3.1.17.4.2, preliminary results, and plans for future work, and Tour Midway Valley. |
| 9/23-25/92 Bethesda, MD | ACNW 46th Meeting | | Gil (LeRoy-M&O) | | Discuss with EPA recent consideration of C-14 release limits, progress report by NRC's LLWM division, proposed guide on 10CFR20 ALARA criteria. |
| 9/30- 10/1/92 (Las Vegas, NV) | NWTRB Dry Run | D. Harrision | Cooper (Hoffman-SAIC) | M&O LLNL PNL | |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/11/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|---|-------------------------------------|------------------------------|----------------------------------|---|
| 10/14-15/92 Las Vegas, NV (Plaza Suite Hotel) | NWTRB Full Board ** | D. Harrison | Cooper (Hoffman-SAIC) | M&O LLNL PNL | Source term; 1) Concept and release mechanisms, 2) spent fuel testing, 3) PA and design implications. |
| 10/16/92 Las Vegas, NV | NWTRB Yucca Mountain Site Tour ** | | Cooper (Hoffman-SAIC) | | |
| 10/20/92 Las Vegas, NV | ACNW WG on Human Intrusion ** | | Gil (LeRoy-M&O) | | Discuss methodologies for assessment of potential for natural resources at YM, and relationship between such resources and potential for human intrusion. |
| 10/21/92 Las Vegas, NV | ACNW 47th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD. |
| 10/22/92 | ACNW Yucca Mountain and NTS Tours | | Gil (LeRoy-M&O) | | Agenda TBD. |
| 10/23/92 | ACNW GIS Tour | | Gil (LeRoy-M&O) | | Tour will take place in the morning only. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/11/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|--|--|-------------------------------------|------------------------------|----------------------------------|--|
| 10/30/92 San Antonio, TX (TENTATIVE) | NRC TE: CNWRA Functional Analysis of 10CFR60 ** | | Bjerstedt (LeRoy-M&O) | M&O | Discuss methods and results of DOE PACE, TSPA, and NRC IPA. Discuss CNWRA activities related to systems engineering. |
| 11/4-6/92 Denver, CO (TENTATIVE) | NWTRB SG&G Panel Meeting ** | | Cooper (Hoffman-SAIC) | M&O | Discuss ESF and repository design. |
| 11/16-17/92 Bethesda, MD | ACNW 48th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD |
| 11/17/92 Albuquerque, NM | NRC TE: Volcanism ** | Cooper (Jerez-M&O) | Bjerstedt (LeRoy-M&O) | M&O LANL | Discuss DOE volcanism studies as detailed in LANL report. |
| 11/18/92 Bethesda, MD | ACNW WG Climate ** | | Gil (LeRoy-M&O) | | Discuss the potential for climate changes in Southern Basin and Range and the impact on natural processes affecting PA of potential repository at YM. Original scheduled 11/19/91, this has been rescheduled from 4/22/92. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/11/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|--|---|---|--------------------------------------|----------------------------------|--|
| Date and Location TBD Rockville, MD | Interaction Planning Meeting ** | Bjerstedt (LeRoy-M&O) | Bjerstedt (LeRoy-M&O) | M&O | Discuss/plan DOE/NRC interactions for first half 1993. Previously scheduled 11/18/92. |
| 11/18-20/92 Albuquerque, NM | DOE Workshop on Expert Judgment ** | Dyer/Boak (Yunker-M&O, Van Luik-M&O, Weaver-M&O) | Simmons (Hoffman-SAIC) | M&O | Examine DOE's use of expert judgment for YMP, learn how other projects have used expert judgment, make recommendations for future use, fulfill NWTRB recommendation to hold workshop. |
| 12/14-15/92 Rockville, MD | NRC TE: Total System Performance Assessment ** | Boak (Pahwa-M&O) | Bjerstedt (LeRoy-M&O) | M&O SNL PNL | |
| 12/16/92 Bethesda, MD | ACNW WG on PA - Phase 2 HLW Interactive PA by NRC ** | Boak (Van Luik-M&O) | Gil (LeRoy-M&O) | M&O SNL | Will discuss progress of Phase 2 PA effort. Also will hear briefing from DOE on status of TSPA. |
| 12/17-18/92 Bethesda, MD | ACNW 49th Meeting | | Gil (LeRoy-M&O) | | Agenda TBD. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/11/92

| <u>DATE/LOC.</u> | <u>TOPIC</u> | <u>TECHNICAL LEAD (SUPPORT)</u> | <u>CONTACT (SUPPORT)</u> | <u>PARTICIPANT (SUPPORT)</u> | <u>COMMENTS</u> |
|---|--|-------------------------------------|------------------------------|----------------------------------|---|
| Delayed to early 1993 Albuquerque, NM | WIPP Roundtable discussion - NRC observation ** | Boak (Van Luik-M&O) | Bjerstedt (LeRoy-M&O) | M&O SNL PNL | NRC staff observe interaction between YMPO PA and WIPP PA. Previously scheduled 10/27/92. |
| Delayed to early 1993. Carlsbad, NM | Tour of WIPP Site | Boak (Van Luik-M&O) | Bjerstedt (LeRoy-M&O) | M&O | Previously scheduled 10/28/92. |
| 1/5-6/93 Arlington, VA | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | M&O systems update and ESF and respiratory design follow-up. |
| 2/93 or 3/93 TBD | NWTRB HG&G Panel Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 4/20-23/93 Reno, NV | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 6/1/93 TBD | NWTRB International Trip | | Cooper (Hoffman-SAIC) | | Agenda TBD. |
| 7/12-15/93 Denver, CO | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

STATUS OF DOE NWTRB, ACNW, AND NRC MEETINGS FOR WEEK ENDING 9/11/92

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|------------------------------|-----------------------------------|-------------------------------------|------------------------------|----------------------------------|-----------------|
| 10/19-22/93 Las Vegas, NV | NWTRB Full Board Meeting ** | | Cooper (Hoffman-SAIC) | | Agenda TBD. |

BOLD INDICATES REVISIONS AND NEW INFORMATION
**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

**DRILLING, TRENCHING, AND TEST PIT ACTIVITIES
9/11/92**

| <u>DESIGNATION</u> | <u>PLANNED START DATE</u> | <u>PLANNED END DATE</u> | <u>BACKFILL DATE</u> | <u>YMPO SITE CONTACT</u> | <u>COMMENTS</u> |
|---|---------------------------|-------------------------|----------------------|--------------------------|---|
| Busted Butte Pavement Study | 8/4/92 | 8/28/92 | N/A | Sullivan | Map any expression of Quaternary faulting in the exposures at Busted Butte. |
| Midway Valley Investigations | 7/22/92 | 8/7/92 | N/A | Sullivan | Four (one additional is optional) gravity and Magnetic evaluation lines going East-West across Midway Valley were completed. |
| Soil and Rock Properties Test Pits (Phase II) | 8/17/92 | 10/31/92 | TBD | Williams | Excavate 41 test pits for engineering properties of planned roads, one each fields, and concrete aggregate sources. Data for design of ESF. |
| Fran Ridge Test Pit No. 1 | 8/24/92 | 9/15/92 | N/A | Girdley | Bedrock excavation in Topopah by controlled blasting. Fracture network mapping will be undertaken. |
| Crater Flat Trenches | 8/17/92 | 8/22/92 | TBD | Sullivan | Three trenches across Quaternary faults were excavated for detailed mapping. |

BOLD INDICATES REVISIONS AND NEW INFORMATION

**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**

WEEKLY INTERACTIONS CALENDAR

**DRILLING, TRENCHING, AND TEST PIT ACTIVITIES
9/11/92**

| <u>DESIGNATION</u> | <u>PLANNED START DATE</u> | <u>PLANNED END DATE</u> | <u>BACKFILL DATE</u> | <u>YMPO SITE CONTACT</u> | <u>COMMENTS</u> |
|--|---------------------------|-------------------------|----------------------|--------------------------|---|
| Volcanic Centers Soil Test and Sample Collection | 9/2/92 | 9/3/92 | 9/3/92 | Cooper | Continue examination of soil development on volcanic rocks to test results of chronology studies. Collect samples of volcanic rocks for petrology studies. This activity began July 1991 and occurs periodically. |
| Lathrop Wells Cinder Cone Volcanic Trenching | 9/8/92 | 9/16/92 | 9/16/93 | Cooper | Continuation of the volcanic studies. |
| Unsaturated Zone Borehole No. 16 | 5/27/92 | 3/24/93 | N/A | Long | Unsaturated zone site characterization and vertical seismic profiling. |
| Neutron-Access Boreholes Phase II (12 boreholes) | 8/3/92 | TBD | N/A | Girdley | Core taken from these holes will be used by USGS for determination of moisture content and to construct tritium profiles. |

BOLD INDICATES REVISIONS AND NEW INFORMATION
**** = MEETINGS THAT ARE OPEN TO THE PUBLIC**



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

WBS 1.2.3
QA: N/A

SEP 18 1992

J. Russell Dyer, YMP, NV
Winfred A. Wilson, YMP, Mercury, NV, M/S 717

FIELD TEST COORDINATOR'S REPORT FOR THE WEEK ENDING SEPTEMBER 11, 1992

UZ-16

Scope of Activity: A borehole approximately 1700 feet in depth will be drilled using the LM-300 drilling system. The primary purpose of the hole will be for vertical seismic profile testing, although other tests such as air permeability, hydrogeochemistry, and matrix hydrologic properties are also being planned. Drilling is scheduled from May through December 1992, following pad construction in March 1992.

Status as of September 11, 1992: The LM-300 drill rig was non-operational during the reporting period. Work continues to replace the front Allison transmission which on August 28, 1992, was diagnosed as having mechanical difficulties. Borehole UZ-16 prior to the mechanical shutdown was advanced to a core depth of 673.41 feet and a ream depth of 639.16 feet.

NEUTRON-ACCESS BOREHOLES

Scope of Activity: Approximately 24 shallow boreholes will be drilled/cored for neutron logging by the U.S. Geological Survey (USGS) in order to evaluate natural infiltration. Core taken from these holes will be used by USGS for determination of moisture content and to construct tritium profiles. The drilling operation utilizes an Odex drilling system, which produces HQ core and a cased hole having a diameter of approximately six inches. The drilling program is being implemented in two phases, each consisting of 12 boreholes that will take several months to complete.

Status as of September 11, 1992: Borehole USW-UZN-31 continues to be drilled with the CME 850 drill rig. It is the first of a pair of holes adjacent to each other in Split Wash near the trace of the Ghost Dance fault. By the end of shift on Friday, September 11, 1992, coring had reached a depth of 59.87 feet; ream depth was 50.52 feet. All samples recovered were dry. SF₆ tracer gas was injected during drilling operations.

QUATERNARY FAULTING WITHIN THE SITE AREA INVESTIGATIONS

Scope of Activity: Pavements and trenches will be excavated to provide exposures of Quaternary deposits and faults for mapping by geologists from the USGS as described in Study Plan 8.3.1.17.4.6 Quaternary Faulting in the Site Area. Planned activities include excavation of new trenches and modification of existing trenches on the Windy Wash fault, Solitario Canyon fault, and Stagecoach Road fault, and modification of existing exposures of the Paintbrush Canyon fault west of Busted Butte in the sand ramps by developing pavements.

Status as of September 11, 1992: Excavation of three trenches to expose the Stagecoach Road fault south of Yucca Mountain is complete. Excavation of trench SCR-2 which had commenced on September 4, 1992, was completed on September 8. The equipment was mobilized to the third trench, SCR-3, and excavation completed on September 9. The perimeters of all three trenches were fenced. The Stagecoach Road fault was exposed in the SCR-1 and SCR-3 trenches.

SOIL AND ROCK PROPERTIES

Scope of Activity: Objectives of this investigation are to characterize the soil and rock conditions that will influence or be influenced by the construction of the Exploratory Studies Facility surface and subsurface access facilities. Phase I of this activity was previously completed and included a total of 32 test pits and one drill hole (NRG-1). Ongoing Phase 2 activities include 41 additional test pits and pavement clearing at NRG-1..

Status as of September 11, 1992: Clearing of bedrock pavement at the NRG-1 drill hole access road cutslope was completed on September 11, 1992, using hand labor and a blowpipe supplying a jet of air and water. Equipment supporting clearing operations included a front end loader, backhoe, air compressor and water truck.

CHARACTERIZATION OF STRUCTURAL FEATURES IN THE SITE AREA

Scope of Activity: Objectives of this investigation are to conduct prototype work for development of equipment and techniques for shaft mapping in the Exploratory Studies Facility. Developmental work is to be completed in an enlarged and deepened circular test pit on the east side of Fran Ridge. The area around the pit disturbed during the original excavation will be cleaned to the rock surface for use in pavement studies for Surface Fracture Network Studies.

Status as of September 11, 1992: Clearing of pavement at Fran Ridge commenced on September 8, 1992 and is ongoing. The pavement clearing is being completed with hand labor and a blowpipe supplying a jet of air and water. Equipment supporting clearing operations included a front end loader, backhoe, air compressor, and water truck.

Excavation operations for enlargement of the existing test pit at Fran Ridge were completed on September 11, 1992. Mucking of blast debris and bedrock cleanup was performed during this reporting period.

SEP 18 1992

VOLCANISM EXCAVATIONS

Scope of Activity: Test pits and trenches will be excavated at the Lathrop Wells Volcanic Center and at the Cima volcanic field in order to test alternative models of eruptive histories of cinder cone volcanic activity. The excavations will provide exposures of volcanic materials (lava flows, pyroclastic deposits) and soils for examination and collection of samples. Planned activities include collection of samples for age determinations by multiple methods, description and collection of samples for evaluation of soil development on volcanic units, exposure of contact relations to aid stratigraphic studies for mapping of volcanic centers, and collection of samples for petrologic analysis.

Status as of September 11, 1992: A large trench was constructed by Reynolds Electrical & Engineering Co., Inc., beginning September 8, 1992, in order to expose a large section beneath the lava flow Q1, on the north flank of the Lathrop Wells cone. The trench was completed at noon on September 10, 1992, and was largely successful. The principal investigator, Bruce Crowe, conducted a reconnaissance examination of the exposures and noted stratigraphy including pyroclastic units and a buried lava flow beneath Q1. On September 16, 1992, this trench will be shown to the Nuclear Waste Technical Review Board on a tour associated with their volcanism meeting.

If you have any questions, please contact me at 794-7944.



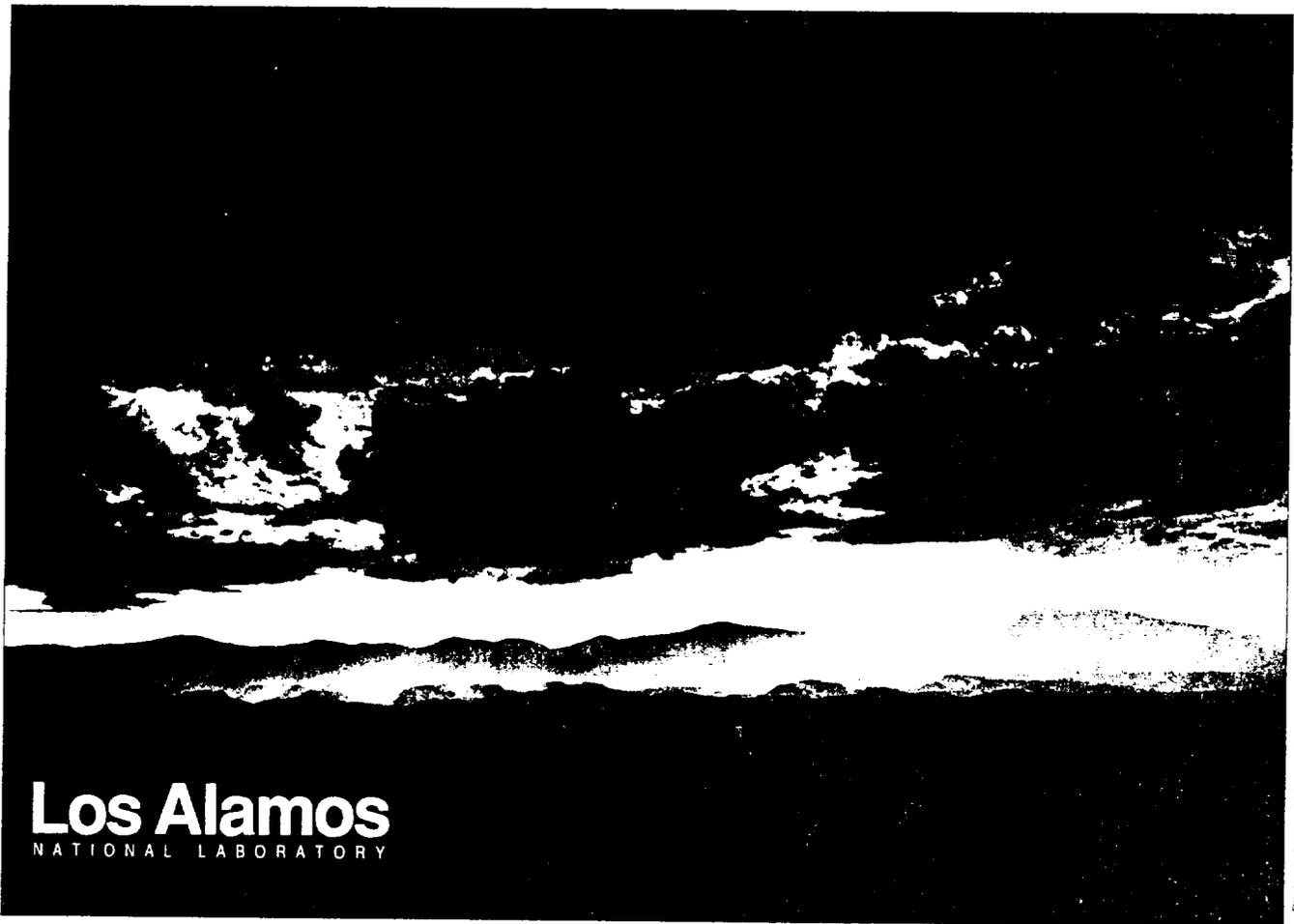
Uel S. Clanton, Chief
Site Investigations Branch
Regulatory & Site Evaluation Division

RSED:KJS-5663

Yucca Mountain Site Characterization Project

Monthly Activity Report

August 1992



Photograph by Chris J. Lindberg

Los Alamos
NATIONAL LABORATORY

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Attachment to TWS-EES-13-09-92-044

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LOS ALAMOS NATIONAL LABORATORY
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

Monthly Activity Report

August 1992

WBS 1.2.1 Systems

Objective The objective of this task is to integrate systems with the Geologic Repository Program, to describe the Yucca Mountain Site Characterization Project Mined Geologic Disposal System, and to evaluate the performance of the natural, engineered barrier, and total systems for meeting regulatory standards.

Technical Data (WBS 1.2.1.3.5)

Activities and Accomplishments Entered data into the Automated Technical Data Tracking System for Activities 8.3.1.3.2.1.2, "Calcite Deposits In Drill Cores USW G-2 and USW GI-3/G-3 at Yucca Mountain, Nevada"; 8.3.1.3.2.2.1, "Pedogenesis of Siliceous Calcretes of Yucca Mountain, Nevada"; 8.3.1.3.2.2.2, "Dehydration and Rehydration of a Tuff Vitrophyre"; and 8.3.1.3.2.2.1, "Bedrock Breccias Along Fault Zones Near Yucca Mountain, Nevada."

Planned Activities Submit data from Activities 8.3.1.8.1.3.2, 8.3.1.3.6.1.1, and 8.3.1.3.2.1.3 to the Technical Data Base.

Caisson Experiment (WBS 1.2.1.4.6)

Activities and Accomplishments The NEPA categorical exclusion for the caisson experiment was granted by the Albuquerque Operations Office on 17 August. Efforts are underway to complete the lower-boundary condition apparatus and to fill the lower part of the caisson. We are waiting for the porous cups, which are on backorder from the manufacturer.

Neutron probe tubes have been prepared for installation during filling of the caisson.

Planned Activities Prepare caisson for filling.

Continue to fabricate lower-boundary condition apparatus as material becomes available.

Publications None

Performance Assessment Calculational Support (WBS 1.2.1.4.7)

Activities and Accomplishments

No activity reported this month.

WBS 1.2.3.1 Site Management and Integration

Site Management (WBS 1.2.3.1.1)

Objective The objective of this task is to manage and integrate site characterization activities.

Activities and Accomplishments B. Carlos attended the SOC meeting at the Sample Management Facility. It was reported that SOC representatives visited the UZ-16 drilling operation. A potential conflict with striping of fractures was resolved during the meeting.

E. Springer attended Integrated Test Evaluation (ITE) meeting in Las Vegas on 27 August to review the ITE report.

Test Management and Integration (WBS 1.2.3.1.2)

Objective The objective of this task is to provide coordination for Los Alamos surface-based test planning and package development.

Activities and Accomplishments ESF Test Coordination. Initiated field construction and testing activities (as defined by TPP 92-07, "Fran Ridge Test Pit Mapping," and its associated job package, JP 92-7.) Record packages were submitted to the local records center.

Surface-based Test Coordination. Continued to merge our administrative data base with YMP GIS to identify and track Los Alamos interfaces with other site characterization surface-based testing activities.

Planned Activities Continue support of Los Alamos surface-based site characterization activities in response to Project program directives.

WBS 1.2.3.2.1.1.1 Mineralogy, Petrology, and Rock Chemistry of Transport Pathways

Objective The purpose of this activity is to define the important mineralogical and geochemical variables along fracture and rock-matrix transport pathways at Yucca Mountain, in support of performance assessment and to evaluate the impact of repository construction on natural waste-transport barriers.

Activities and Accomplishments Staff continued to write operating procedures and develop software for the INEL microdiffractometer.

The revised paper, "Calcite deposits in fractures of drill cores USW G-2 and USW GU-3/G-3 at Yucca Mountain, Nevada," (milestone 3120) was submitted to the LANL TPO for policy review. B. Carlos and D. Vaniman visited the SMF from 31 August -1 September to examine the upper portion of drill core UZ-16 in order to select calcite and opal samples for further analysis during FY93. These samples will permit detailed sampling of the transition zone from micritic to sparry calcite.

The report, "Geologic evaluation of six nonwelded tuff sites for a surface-based test facility for the Yucca Mountain Project," (milestone 3137) is in revision. This report includes data on hydrologic properties (A. Flint, USGS) and mechanical properties (C. Rautman, SNL), as well as the mineralogical and chemical data collected at Los Alamos.

In fracture mineralogy studies, B. Carlos continued SEM studies of zeolites. Data currently being collected will be used to prepare a paper for the Zeolite '93 conference in Boise, Idaho, on 20-28 June. W. Cosgriff, a college student, has been hired to assist B. Carlos with analysis of fracture minerals.

Planned Activities Work planned within the next few months includes the following activities: (1) continue analysis of fracture fillings in the Paintbrush Tuff to determine mineral distribution and factors controlling that distribution and (2) continue analysis of calcites to understand transport and precipitation mechanisms.

Problem Areas None

Milestone Progress

3120
30 June 1992.
Calcite in the Upper Paintbrush Tuff
Completed and submitted to TPO

3130
17 August 1992
Fracture Mineralogy of the Paintbrush Tuff

3137
30 September 1992
Geologic Evaluation of Six Nonwelded Tuff Sites for a Surface-based Test Facility for the Yucca Mountain Project
In technical review.

Publications

B. Carlos, D. Bish, S. Chipera, and S. Craven
Fracture-Lining Manganese Oxide Minerals in a Silicic Tuff
Journal article, *Chemical Geology*
Approved by YMPO; submitted for publication.

G. D. Guthrie, D. L. Bish, and B. T. Mossman
Quantitative Analysis of Zeolite-Bearing Dusts Using the Rietveld Method
Journal article, *Science*
Submitted.

D. Vaniman, D. Bish, D. Broxton, B. Carlos, S. Chipera, and S. Levy
Mineralogy as a Factor in Radioactive Waste Transport Through Pyroclastic Rocks at Yucca Mountain, Nevada
Journal article, *Journal of Geophysical Research*
Submitted to YMPO.

WBS 1.2.3.2.1.1.2 Mineralogical and Geochemical Alteration

Objective The objective of this task is to characterize past and present natural alteration processes that have affected the potential geologic repository and to predict future effects of natural and repository-induced alteration.

Activities and Accomplishments Staff transmitted responses by G. Valentine, B. Crowe, D. Vaniman, and S. Levy to the recommendations made in the National Academy of Science report, "Ground Water at Yucca Mountain: How High Can it Rise?" to the M&O. Published and in-progress work by D. Bish and G. WoldeGabriel was also cited.

Additional text and figures were supplied for the YMP topical report on calcite-silica deposits at Trench 14 and Busted Butte.

Electron microprobe analysis of altered rocks from Busted Butte and Yucca Mountain (Harper Valley) continued. Studies of these rocks will help resolve the question about recent hydrothermal activity around Yucca Mountain and will be incorporated in the final report on breccias and hydrothermal alteration.

Planned Activities Chemical and mineralogical characterization of samples from hydrothermal deposits exposed at the surface will continue.

We will contribute additional information to the YMP topical report on calcite-silica and breccia deposits. We will review the most recent unpublished report on groundwater discharge and alteration history by J. Szymanski.

Sample preparation and characterization of material for K/Ar studies will continue. G. Woldegabriel is preparing an invited presentation on K/Ar studies of zeolites for the Zeolite '93 conference.

Problem Areas None

Milestone Progress 3138
30 October 1992
Chemical Transport in Zeolitic Alteration
60% complete.

3141
31 March 1992 (delayed due to participation in the issue resolution process)
Laminated Zone in Trench 14
65% complete. (Technical review complete.)

17 August 1992
Fracture Alteration in the Busted Butte
100%
30 September 1992
Genesis & Evolution of Six Nonwelded Tuff Units for a Deeply-eroded Test Facility in the Yucca Mountain Project
In technical review

3142
31 July 1992
K/Ar Dating of Clays and Zeolites
In technical review.

3143
30 April 1992
Experimental Dehydration of Volcanic Glasses
In program review.

3150
15 April 1993
Final Report on Bedrock
30% complete.

Publications

D. Bish and J. Aronson
Paleothermal and Paleohydrologic Conditions in Silicic Tuff from Yucca Mountain, Nevada
Journal article, *Clay and Clay Minerals*
Approved by YMPO.

S. Levy and C. Naeser
Bedrock Breccias Along Fault Zones near Yucca Mountain, Nevada
Chapter in USGS Bulletin on Yucca Mountain studies
In USGS editorial review.

S. Reneau
Manganese Accumulation in Rock Varnish in a Desert Piedmont, Mojave Desert, California, and Application to Evaluating Varnish Development
Journal article, *Quaternary Research*
Approved by YMPO.

D. Vaniman, D. Bish, and S. Chipera
Dehydration and Rehydration of a Tuff Vitrophyre
Journal article, *Journal of Geophysical Research*
Submitted to YMPO.

D. Vaniman, S. Chipera, and D. Bish
Pedogenesis of Siliceous Calcretes at Yucca Mountain, Nevada
Journal article, *Science*
Submitted to YMPO.

WBS 1.2.3.2.1.2 Stability of Minerals and Glasses

Objective

The objective of this activity is to produce a model for past and future mineral alteration in Yucca Mountain. The model is intended to explain the natural mineral evolution resulting from the transformation of metastable mineral assemblages to more stable assemblages and the effects of a repository emplacement.

Activities and Accomplishments

This activity has been deferred.

WBS 1.2.3.2.5 Postclosure Tectonics

Objective The objective of these volcanism studies is to determine the hazards of future volcanic activities with respect to siting a high-level radioactive waste repository at Yucca Mountain.

Activities and Accomplishments A preliminary draft of Study Plan 8.3.1.8.1.2, "Physical Process of Magmatism and Effects on the Repository," has been forwarded to the DOE for submission to the NWTRB.

The first draft of the Issue Resolution Report was completed and will soon be submitted for internal review.

A video conference, the first of its kind between the DOE and NRC, was held with the NRC to discuss their comments and questions on Study Plan 8.3.1.8.1.1, "Probability of Magmatic Disruption of the Repository."

The age of the Q13 lava was obtained using the cosmogenic ^3He method. The lava yielded duplicate ages of 64.6q7.4 and 72.8q8.6 ka, which is significantly older than an age of about 25 ka obtained using the thermoluminescence method.

Trace-element data for 40 from Lathrop Wells and Black Cone volcanic centers were analyzed by instrumental neutron activation analyses.

Chemical analyses of soils from trenches constructed on the north flanks of the Lathrop Wells volcanic center were obtained.

Detailed technical procedure (DP) 610, R0, "Extraction and Analysis of Noble Gases from Solids," was approved and distributed.

Work in Progress. Revised calculations were made using data from the newly recognized Pliocene basalt centers. Regression calculations of the latitude and longitude of vent sites for the Crater Flat volcanic zone were completed. Revised plots of cumulative magma volume versus time, which included the new data points, were completed.

Material was prepared for the September subcommittee meeting of the NWTRB.

The current status of U-Th disequilibrium measurements is as follows: a sample from Q16 has been separated, dissolved, and the U-Th concentrations were measured; a duplicate sample from Q14 has been separated and dissolved; a sample from Q15 has been ground for mineral and phase separations; and a sample from Little Black Peak cone has been separated and dissolved.

Planned Activities Finalize the Issue Resolution report; it will be completed by 30 September.

A meeting with the NWTRB subpanel on tectonics is scheduled for 14-16 September in Las Vegas.

Trenching at the Lathrop Wells volcanic center is planned for the first and third weeks of September.

Problem Areas

We have delayed field mapping of the 3.7 Ma basalt centers of Crater Flat in order to concentrate on completion of the Issue Resolution Report.

Because of time required to prepare for the NRC video conference and for the NWTRB meeting, the Issue Resolution Report will be delayed. It will be completed in September 1992.

Milestone Progress

3174

8 January 1992

Effects of Magmatic Disruption on the Repository (Study Plan 8.3.1.8.1.2, R0)

3034

30 September 1992

Report on Magma System Dynamics

3109

30 September 1992

Report of Subsurface Effects

3111

30 September 1992

Preliminary Geologic Mapping of Volcanic Centers

3164

30 September 1992

Progress Report on Thermoluminescence

R482

31 August 1992

Issue Resolution Report

Publications

B. M. Crowe, et al.
Issue Resolution Report
First draft complete.

S. G. Wells, et al.
Multiple Eruptive Events at Small Volume Basaltic Centers: Evidence From the Cima and Crater Flat Volcanic Fields
Journal article
In preparation.

WBS 1.2.3.3.1.2.2 Water-Movement Tracer Tests

| | |
|---------------------------------------|--|
| Objective | The objective of the water-movement tracer tests is to obtain measurements of chlorine isotope distributions to help quantify the percolation of precipitation in the unsaturated zone. |
| Activities and Accomplishments | <p>Thirty-one samples were prepared by Hydro Geo Chem for chlorine-36 analysis by the University of Rochester and Lawrence Livermore National Laboratory. These samples were taken from the neutron-access bore holes, USW N37, N54 and N55, as well as Midway Valley soil.</p> <p>Hydro Geo Chem evaluated using an amperometric detector for improving the detection limit of the ion-chromatography system for bromide; unfortunately, the sensitivity and reproducibility of signals did not meet the needs of this activity. The effectiveness of concentrator columns will be determined next.</p> <p>Collection of cutting samples for ^{36}Cl analysis from UZ-16 and new neutron access bore holes continued.</p> |
| Planned Activities | Staff will address study plan review comments; revise existing DPs; prepare new DPs; process soil samples for Cl/Br and chlorine-36/Cl ratios; process cuttings samples from neutron-access bore holes; and collect additional soil samples from Yucca Mountain area, as opportunities arise. |
| Problem Areas | None |
| Milestone Progress | <p>3191 <i>Procedure for Chlorine-36 Analysis of Unsaturated Zone Samples</i> 30 September 1992 95% complete</p> |
| Publications | None |

WBS 1.2.3.3.1.2.5 Diffusion Tests In the ESF

Objective The objective of this task is to determine *in situ* the extent to which the nonsorbing tracers diffuse into the water-filled pores of the Topopah Spring welded unit.

Activities and Accomplishments No significant activity in this study.

Milestone Progress No Level II milestones are planned for this fiscal year.

**WBS 1.2.3.3.1.3.1 Site Saturated Zone Groundwater Flow System
(Reactive Tracer Testing)**

Objective Experiments will be conducted at the C-Well complex (holes UE-25c #1, UE-25c #2, and UE-25c #3) and other wells in the vicinity of Yucca Mountain using reactive tracers to characterize retardation and transport properties at a larger scale than currently used in laboratory experiments.

Activities and Accomplishments **Software Qualification.** Z. Dash and B. Robinson continued to serve as temporary Software Configuration Manager and CCB Chair, respectively.

Detection of Microsphere Concentrations. B. Newman completed a preliminary study on the feasibility of using a Los Alamos flow cytometry facility to measure the concentration of fluorescent microspheres. Results appear to be very promising and suggest that this method should be developed further. The instrument, ordinarily used in biological research to sort and isolate individual cells, is very selective, it being able to detect small microsphere concentrations in the presence of very high background colloid concentrations (much higher than would be present in laboratory or field samples). A letter report has been written describing this work, with recommendations for ways to improve the technique.

Planned Activities **Modeling.** No significant progress this month because we have been required to spend a large quantity of time on the SQA effort.

Planned Activities A draft of B. Robinson's paper to be submitted to the *Journal of Radioactive Waste Management* (special issue on the Yucca Mountain Site Characterization Project) has been completed and is in internal technical review.

Planned Activities Continue to contribute to the SQA effort by serving as temporary Software Configuration Manager (Z. Dash) and temporary CCB Chair (B. Robinson).

Complete documentation of batch-sorption experiments with lithium bromide.

Continue modeling studies using FEHMN to support the design of the field tests.

Problem Areas We were unable to make significant progress on our modeling efforts this month because of the large amount of time we devoted to the SQA effort.

Milestone Progress 3188

30 September 1992
Documentation for SORBEQ.

3194
30 September 1992
Batch Sorption Experiments with Lithium

T112
22 June 1992
Final Documentation for FEHMN
Delayed due to personnel reassignment.
3196

27 July 1992
FRACNET Documentation
Delayed due to change of assignment for principal investigator.

R529
Evaluation of Preliminary Application of FEHMN to Yucca Mountain
Completed.

Publications

B. A. Robinson
FRACNET—Fracture Network Model for Water Flow and Solute Transport
LA-series report
In preparation.

B. A. Robinson
SORBEQ—A One-Dimensional Model for Simulating Column Transport Experiments
LA-series report
In preparation.

B. A. Robinson
A Strategy for Validating a Conceptual Model for Radionuclide Migration in the Saturated Zone Beneath Yucca Mountain
Journal article, *Radioactive Waste Management and the Nuclear Fuel Cycle - Special issue on the Yucca Mountain Project*
In preparation.

W. L. Polzer and E. H. Essington
The Use of Selectivity Coefficients to Estimate Modified Langmuir Isotherm Parameters as a Function of Experimental Conditions
Journal article, *Radioactive Waste Management and the Nuclear Fuel Cycle - Special issue on the Yucca Mountain Project*
In preparation.

W. L. Polzer, M. G. Rao, H. R. Fuentes, and R. J. Beckman
Thermodynamically Derived Relationships Between the Modified Langmuir Isotherm and Experimental Parameters
Journal article, *Environmental Science and Technology*
Accepted.

WBS 1.2.3.4.1.1 Groundwater Chemistry Model**Objective**

The goal of this investigation is to provide conceptual and mathematical models of the groundwater chemistry at Yucca Mountain. These models will explain the present groundwater composition in relation to interactions of minerals and groundwater and will be used to predict groundwater compositions as a result of anticipated and unanticipated environments.

Activities and Accomplishments

Study Plan. Review of comments and revision of the Groundwater Chemistry Model Study Plan, R0, continued.

Other Activities. The matrix for investigating most-active groundwaters was refined. The objective is to categorize groundwaters by compositional variables that affect radionuclide solubility and/or sorption properties. Variables of interest presently are measured Eh potential, pH, and bicarbonate content. EQ3/6 is being used to conduct simulations using the different kinds of groundwater compositions. A letter report describing the results of this exercise is due 30 September and is on schedule.

QA Activities. No additional progress to report on the IMOU between LLNL and Los Alamos. IMOU is in review in Las Vegas.

Planned Activities

Continue resolution of comments on study plan.

Complete letter report on most-active groundwater.

Continue USGS collaboration. Delays in material and equipment for the USGS down-hole sampler could slow progress on testing of conceptual models of groundwater chemistry at Yucca Mountain.

Continue support of QA efforts. Continue tracking IMOU mentioned above.

Problem Areas

None

Milestone Progress

3006

31 August 1992

Eh and pH Buffering Capacity

3415

30 September 1992

Most-Active Groundwater Chemistry

Publications

None

WBS 1.2.3.4.1.2.1/3 Batch-Sorption Studies and Sorption Models

Objective The objective of this task is to provide sorption coefficients for elements of interest to predict radionuclide movements from the repository to the accessible environment.

Activities and Accomplishments Experiments to measure the batch-sorption coefficients of neptunium on crushed-tuff samples under a variety of pH, pCO₂, and water compositions were started by K.-H. Kung with the assistance of C. Overly. The rock samples and Np-traced solutions will be allowed to react until 15-17 September.

Experiments were started to evaluate the properties of a new type of filter for separating the solution and solid (+colloidal) phases after reaction in a batch-sorption determination. The filters used previously for this purpose are no longer available.

BET surface area results for ~40 samples have been obtained from Quantachrom Corp. for use in the study of sorption coefficient dependence on particle grinding. Results show that there is little dependence of surface area on the rock particle size down to 38 mm diameter, indicating that both the zeolitized- and devitrified-tuff samples studied have "accessible" surface area that is controlled by features (pores, exchange sites, open grain boundaries, microfractures) of a spatial scale smaller than this.

M. Hawley has obtained the first atomic resolution images of goethite, an iron oxy-hydroxide mineral with extremely high surface sorption capacity for many cations. Goethite is expected to be an important sorbing component of fracture linings in Yucca Mountain. Its sorption behavior can also be compared with that of hematite to provide important insights into possible sorption mechanisms. To our knowledge, no one has yet published such high resolution AFM scans of goethite.

Planned Activities Batch-sorption experiments for neptunium will be permitted to react until mid-September, when the solution and solids will be separated and prepared for scintillation counting.

Tests of the new type of filter will be completed.

We will prepare the milestone report covering the dependence of sorption coefficients on particle size and water composition, now that important surface area measurements have been made.

Problem Areas None

Milestone Progress 3009
30 September 1992
Variation of Water-Rock Ratio Sorption Coefficients on Zeolitic Tuff

3212
30 September 1992
Progress Report on Single Mineral Experiments

Publications

A. Meijer

A Strategy for the Derivation and Use of Sorption Coefficients in Performance Assessment Calculations for the Yucca Mountain Site

Conference proceedings, *Proceedings of the DOE/Yucca Mountain Site Characterization Project Radionuclide Adsorption Workshop at Los Alamos National Laboratory September 11-12, 1990. (LA-12325-C, 1992)*

Published.

WBS 1.2.3.4.1.2.2 Biological Sorption and Transport

| | |
|---------------------------------------|--|
| Objective | The purpose of this research is to determine whether microbial activity can influence the movement of plutonium in tuff. Because fluids are used extensively in the exploration of locations for a nuclear repository, those micro-organisms capable of utilizing drilling fluids as growth substrates are of special interest. |
| Activities and Accomplishments | <p>As reported previously, staff has been investigating the dissolution of hematite by <i>Pseudomonas</i> sp. Results to date have indicated that the presence of microorganisms does increase mineral dissolution.</p> <p>Unsaturated flow columns are now being constructed to study microbial activities in unsaturated environments, specifically establishing long-term sterile conditions within a soil column.</p> <p>Work continued on milestone 3080, "Chelation," and 3092, "Colloidal Agglomeration."</p> |
| Planned Activities | <p>Continue plutonium K_d experiments.</p> <p>Continue colloidal agglomeration experiments.</p> |
| Problem Areas | None |
| Milestone Progress | <p>3080 30 September 1992 <i>Report on Chelation</i> In preparation.</p> <p>3092 30 September 1992 <i>Report on Colloidal Agglomeration</i> In preparation.</p> <p>3176 30 September 1992 <i>Procedure for Determination of Formation Constants</i> In progress.</p> <p>3177 30 September 1992 <i>Procedure for Determination of Effects on Colloidal Agglomeration</i> In preparation.</p> |
| Publications | <p>L. R. Hersman, D. E. Hobart, and T. W. Newton <i>Preliminary Evidence of Siderophore/Plutonium Complexation</i> Journal article, <i>Journal of Applied and Environmental Microbiology</i> Resubmitted.</p> |

WBS 1.2.3.4.1.3 Radionuclide Retardation by Precipitation Processes

Objective

The objective of the solubility determination task is to determine the solubilities and speciation of important waste elements under conditions characteristic of the repository and along flow paths from the repository into the accessible environment.

Activities and Accomplishments

We completed the study plan revision, and all comments have been addressed. We also completed the Validation of Estimates phase of the planning and scheduling activity, identifying 16 discrete study plan activities.

Speciation Studies. Results of our plutonium carbonate NMR studies are being written up and will be submitted to the *Journal of the American Chemical Society*.

We prepared Np(V) solutions for sorption studies; processed Pu(III) NMR data; and reprocessed Pu residues for new experiments.

D. Clark and P. Palmer have developed a technique for growing single crystals of Pu(IV) carbonate complexes for study by x-ray crystallography and solution NMR. This first-time structural analysis of Pu(IV) carbonate complexes will provide valuable speciation information about them.

We plan to conduct several additional PAS experiments to address the issue of the number of species present in the solutions. We have collected a small quantity of additional data in a new wavelength range and will look for traces of specific oxidation states in this range. These experiments will be completed in approximately one month.

We continued to write Milestone Report 3031, "Plutonium(IV) and Plutonium(VI) Carbonate Speciation Studies by NMR and PAS Spectroscopies"; it will be completed by 30 September.

Solubility Studies. We continued determining the solubility of Np, Pu, and Am in UE-25p #1 water at 60°C. The Np undersaturation experiments at pH 7 again showed pH-dependent concentration variations as reported in June 1992. (Because we measured a higher Np concentration at pH 6.78 than at pH 7.00, we have noted the measured pH along with Pu(IV) concentrations in Table II.) Because the three Np undersaturation experiments yielded the same results as in the oversaturation experiments, they will be stopped in September, which will allow them to run for the same length of time as the oversaturation experiments.

Two samples from each of the neptunium oversaturation experiments, a dried unwashed sample and a sample washed with small amounts of water and ethanol before drying, were prepared for x-ray powder diffraction measurements. The powder patterns were compared with the following published patterns: a) orthorhombic $\text{Na}_{0.6}\text{NpO}_2(\text{CO}_3)_{0.8}\cdot 2\text{H}_2\text{O}$, b) orthorhombic $\text{Na}_{0.6}\text{NpO}_2(\text{CO}_3)_{0.8}\cdot \text{nH}_2\text{O}$, and c) monoclinic $\text{Na}_3\text{NpO}_2(\text{CO}_3)_2\cdot \text{nH}_2\text{O}$. The washed and unwashed solids from the pH 6 experiment matched orthorhombic $\text{Na}_{0.6}\text{NpO}_2(\text{CO}_3)_{0.8}\cdot 2\text{H}_2\text{O}$ very well. The unwashed solids from the pH 7 experiment matched orthorhombic $\text{Na}_{0.6}\text{NpO}_2(\text{CO}_3)_{0.8}\cdot \text{nH}_2\text{O}$ very well, and the washed solid matched orthorhombic $\text{Na}_{0.6}\text{NpO}_2(\text{CO}_3)_{0.8}\cdot 2\text{H}_2\text{O}$ well. At pH 8.5, the washed and unwashed solids matched orthorhombic $\text{Na}_{0.6}\text{NpO}_2(\text{CO}_3)_{0.8}\cdot 2\text{H}_2\text{O}$ very well. Each of the powder

**Activities and
Accomplishments
(continued)**

patterns from the experiments at 60°C, both washed and unwashed, was also compared to the powder pattern of the solid produced in the experiment using UE-25p #1 water at 25°C and pH 6; all of them fit this pattern extremely well. Oxidation state determinations were performed on the two remaining plutonium oversaturation experiments at pH 7 and 8.5. The results are listed in Table I, along with those obtained last month for the pH 6 experiment.

**Table I. Plutonium Oxidation State Distribution
at Steady-State In UE-25p #1 Water
at 60°C at pH 6, 7, and 8.5**

| Final Oxidation State Distribution | Initial Pu(IV) Concentration at pH 6, Day 258 (in %) | Initial Pu(IV) Concentration at pH 7, Day 273 (in %) | Initial Pu(IV) Concentration at pH 8.5, Day 278 (in %) |
|------------------------------------|--|--|--|
| Pu(IV) Polymer | (0.4 ± 0.1) | (1.8 ± 0.5) | (1.0 ± 0.1) |
| Pu(III) | (0) | (0) | (3.7 ± 2.0) |
| Pu(IV) | (1.3 ± 0.4) | (0.6 ± 0.5) | (9.6 ± 1.2) |
| Pu(V) | (4.2 ± 0.6) | (5.1 ± 1.1) | (0) |
| Pu(VI) | (94.1 ± 11.1) | (92.5 ± 11.2) | (86.1 ± 11.7) |
| Total Pu Conc. (M) | (9.42 ± 0.84) × 10⁻⁸ | (1.07 ± 0.10) × 10⁻⁷ | (7.00 ± 0.63) × 10⁻⁷ |

The results indicate Pu(VI) as the predominant species formed in UE-25p #1 water at 60°C, whereas at 25°C the predominant species was Pu(V). In J-13 water at 25°C, the predominant species was also Pu(V) (63–73%), but at 60°C the percentage of Pu(VI) rose significantly, especially at pH 6 and 7 (72 and 52 % respectively). The oxidation state changed from predominantly Pu(V) to Pu(VI) when the temperature is increased from 25°C to 60°C in both waters. The higher carbonate content in UE-25p #1 water may provide stronger carbonate complexation in solution, stabilizing the Pu(VI) in UE-25p #1 water compared to J-13 water at the same temperature.

After obtaining oxidation state determinations, the three plutonium oversaturation experiments were stopped, and small portions of the solids were removed for x-ray diffraction studies. The remaining solids were used to start Pu undersaturation experiments the same way the americium/neodymium and Np undersaturation experiments were started (as explained in the letter report for March 1992, TWS-LBL-03-92-02). Each of the three experiments was sampled on day zero and day one and will continue to be sampled until steady-state is reached and maintained for some time. On day one, the aqueous plutonium concentration in all three experiments ranged from 3×10^{-8} to 6×10^{-8} M, already very near the steady-state values obtained in the oversaturation experiments.

The most recent sample of the americium/neodymium experiment at pH 7 yielded a concentration almost an order of magnitude higher than the previous sample. This concentration has varied randomly over an order of magnitude between samplings, and its cause is under investigation. (This experiment also shows sampling-related problems for determining aqueous americium/neodymium concentrations.)

Activities and Accomplishments (cont.)

The results from oxidation state determinations for the pH 8.5 americium/neodymium experiment are being re-examined. Lanthanum fluoride co-precipitation results showed americium in a higher oxidation state such as V or VI; however, the yield of americium in the separation was significantly higher than 100%. Therefore, either some higher oxidation state americium exists in the pH 8.5 experiment, or the americium activity in the one fraction came from an external contamination after the co-precipitation separation. The oxidation state determinations are being repeated to resolve this discrepancy.

Regarding the LBL QA effort, the focus was on preparations for the yearly Los Alamos YMP audit. Three classroom training sessions, including written tests, were held.

The draft detailed technical procedure (DP) for balance calibration was updated to comply with the new QP for Measuring and Test Equipment. Review comments are currently being addressed for other three DPs, "Concentration Determination of Soluble Radionuclides from Data Provided by a Low-energy Gamma-ray Counting System" (LANL-LBL-DP-01), "Calibration of Low-energy Gamma-ray Counters," and "X-ray Powder Diffraction Analysis." They will be sent out for review in the near future.

Planned Activities

Efforts in all areas will continue.

Problem Areas

Alpha radiolysis effects have hampered our analysis of both ^{13}C and ^{17}O NMR data. We have devised a new sample tube, which requires a reversal of our double-containment apparatus for work with intensely alpha-active actinides; we plan to test this new apparatus in the next few months.

Milestone Progress

3010

30 June 1991

Report on Measured Solubilities of Pu, Am, and Np in J-13 Groundwater from Oversaturation Conditions

Submitted 7/29/91

In revision.

3031

30 September 1992

Plutonium(IV) and Plutonium(VI) Carbonate Speciation Studies by NMR and PAS Spectroscopies

On schedule.

3329

30 September 1992

Report on Neptunium, Plutonium, and Americium Solubility Experiments in UE-25p #1 Water from Oversaturation.

On schedule.

3330

1 January 1993

Evaluation of Alternative Detection Schemes in Photoacoustic Spectroscopy
Early completion anticipated.

Letter Report

Spectroscopic Studies of the Hydrolysis of UCl_4 : Spectral Effects of Ligand Exchange
In preparation.

Publications

D. L. Clark, D. E. Hobart, P. D. Palmer, J. C. Sullivan, and B. E. Stout
Carbon-13 NMR Characterization of Plutonyl(VI) Aqueous Carbonate Complexes
Journal article, *Journal of the American Chemical Society*
In preparation.

D. L. Clark, C. D. Tait, D. E. Morris, D. E. Hobart, S. A. Ekberg, and P. D. Palmer
Plutonium(IV) and Plutonium(VI) Carbonate Speciation Studies by NMR and PAS Spectroscopies
LA-series report
In preparation.

D. L. Clark, J. G. Watkins, D. E. Morris, and J. M. Berg
Molecular Models for Actinide Speciation
LA-series report
In preparation.

L. E. Hersman, P. D. Palmer, and D. E. Hobart,
Preliminary Evidence of a Siderophore/Plutonium Complex
Journal article, *Journal of Applied and Environmental Microbiology*
In preparation.

D. E. Hobart, D. L. Clark, P. D. Palmer, J. C. Sullivan, and B. E. Stout
Carbon-13 NMR Characterization of Americyl(VI) Aqueous Carbonate Complexes
Journal article, *Inorganic Chemistry*
In preparation.

D. E. Morris and D. L. Clark
Spectroscopic Studies of the Hydrolysis of UCl₄: Spectral Effects of Ligand Exchange
LA-series report
In preparation.

D. E. Morris, C. D. Tait, S. A. Ekberg, and P. D. Palmer
Speciation of Plutonium in Carbonate Media
Conference abstract, *Materials Research Society*
Approved by YMPO.

H. Nitsche, R. C. Gatti, E. M. Standifer, S. C. Lee A. Miller, T. Prussin,
R. S. Deinhammer, H. Maurer, K. Becraft, S. Leung, and S. A. Carpenter
Measured Solubilities and Speciations of Neptunium, Plutonium, and Americium in a Typical Groundwater (J-13) from the Yucca Mountain Region
LA-series report
Submitted to YMPO.

C. D. Tait, D. E. Morris, J. M. Berg and W. H. Woodruff
Evaluation of Alternative Detection Schemes in Photoacoustic Spectroscopy
Journal article, *Analytical Chemistry or Reviews of Scientific Instrumentation*
In preparation.

C. D. Tait, S. A. Ekberg, and P. D. Palmer, and D. E. Morris
Plutonium Carbonate Speciation Changes
Journal article, *Inorganic Chemistry*
In preparation.

In preparation.

WBS 1.2.3.4.1.4 Radionuclide Retardation by Dispersive, Diffusive, and Advective Processes

| | |
|---------------------------------------|---|
| Objective | The objectives of this task are to determine the rate of radionuclide movement along the potential flow paths to the accessible environment and to examine the effect of diffusion, adsorption, dispersion, anion exclusion, sorption kinetics, and colloid movements in the flow geometries and hydrologic conditions expected to exist along the flow path to the accessible environment in the scenarios used for perform assessment. |
| Activities and Accomplishments | <p>This month we continued Np transport work using crushed-tuff columns made from tuffs G4-1530.3 and G4-275. We began eluting Np in J-13 water through two columns made with tuff G4-1530.3. The flow characteristics of these columns were reported last month.</p> <p>We continued Np batch-sorption experiments with tuffs G4-1530 and G4-275 in USWH-3, UE-25p #1, and J-13 waters to support our transport experiments. Specifically, we conducted batch-sorption experiments with Np solutions and pure mineral separates in hematite, montmorillonite, clinoptilolite, and quartz. We also completed equilibration of these tuffs and mineral separates and began adding Np to the pre-equilibrated tuff and minerals.</p> <p>Staff continued organizing the colloid workshop to be held in early 1993.</p> <p>Four detailed technical procedures were implemented.</p> <p>Staff submitted five technical data information forms summarizing dynamic transport and diffusion studies to the Automatic Technical Data Tracking System.</p> |
| Planned Activities | Continue all work discussed above. |
| Problem Areas | None |
| Milestone Progress | <p>3040 30 September 1992 <i>Kinetics of Sorption on Columns of Pure Minerals</i></p> <p>3044 31 August 1992 <i>Letter Report on Assessment of Available Techniques for Unsaturated Column Transport Experiments</i> In preparation.</p> <p>3027 31 March 1992 <i>Report on Sorption by Batch and Column Techniques</i></p> |

Publications

I. R. Triay
Radionuclide Migration in Tuff under Diffusive Conditions
Conference Paper, *Proceedings of the Migration '91, Jerez de la Frontera, Spain, 14-18 October 1991*
In preparation.

I. R. Triay, A. J. Mitchell, and M. A. Ott
Radionuclide Migration Studies for Validating Sorption Data—Past, Present, and Future
Conference paper, *Proceedings of the DOE/Yucca Mountain Site Characterization Project Radionuclide Adsorption Workshop at Los Alamos National Laboratory September 11-12, 1990. (LA-12325-C, 1992)*
Published.

WBS 1.2.3.4.1.5.1 Retardation Sensitivity Analysis

- Objective** The objectives of this task are to construct a geochemical/geophysical model of Yucca Mountain and to use this model to examine the physical and chemical controls on radionuclide transport along flow paths to the assessable environment.
- Activities and Accomplishments** Certification of TRACRN continued. The Design Phase Baseline was resubmitted in response to RIDS generated by the TRACRN review committee. Verification continued and is nearly complete. Staff found that TRACRN agreed well with the analytic and other numerical solutions being used for the verification exercise. These comparisons were being documented in the Verification and Validation Report. The user's manual is nearly complete.
- Certification of FEHMN and GZSOLVE continued. G. Zyvoloski worked with B. Robinson and Z. Dash (C-Wells Reactive Tracer Task) on their documentation and verification.
- Planned Activities** Continue certification of TRACRN.
- Problem Areas** None
- Milestone Progress** 3052
30 September 1992
Baseline Documentation for TRACRN
- Publications** K. Birdsell, K. Eggert, and B. Travis
Three-Dimensional Simulations of Radionuclide Transport at Yucca Mountain
Journal article, *Radioactive Waste Management and the Nuclear Fuel Cycle - Special issue on the Yucca Mountain Project*
Approved by YMPO; submitted.
- K. Birdsell, K. Campbell, K. Eggert, and B. Travis
Sensitivity Analysis of Integrated Radionuclide Transport Based on a Three-dimensional Geochemical/Geophysical Model
Conference proceedings, *Proceedings of the DOE/Yucca Mountain Site Characterization Project Radionuclide Adsorption Workshop at Los Alamos National Laboratory September 11-12, 1990. (LA-12325-C, 1992)*
Published.

WBS 1.2.3.4.1.5.2 Demonstration of Applicability of Laboratory Data

Objective The purpose of this study is to design and conduct experiments to evaluate the applicability of laboratory data and to test models used in the Radionuclide Transport Program to determine far field radionuclide transport. Both intermediate- and field-scale experiments and natural analogs will be assessed for their potential to provide the required data.

Activities and Accomplishments E. Springer attended the Exploratory Studies Facility's (ESF) test co-ordination meeting in Las Vegas on 18 August. Issues discussed included FY93 plans for the ESF and experiences with implementing field tests at other sites (Basalt and WIPP).

A presentation on proposed Los Alamos field-testing activities for radionuclide transport was made to B. Delakowik from Germany on 24 August in Las Vegas.

Planned Activities Continue to develop study plan.

Problem Areas None

Milestone Progress No FY91 milestones.

Publications C. Loeven
A Summary and Discussion of Hydrologic Data from the Calico Hills Nonwelded Hydrogeologic Unit at Yucca Mountain, Nevada (LA-12376-MS, 1992)
LA-series report
In press.

WBS 1.2.5

Regulatory and Institutional

Objective

The purpose of this task is to coordinate the regulatory and institutional Project requirements within the Los Alamos programmatic structure. The focus of this coordination effort is on the integration of the technical work within the regulatory and institutional framework.

Management and Integration

Los Alamos continued to support closure reports for both the calcite-silica and erosion issues.

Study Plans

Water Movement Test, R1 (8.3.1.2.2.2). R1 has been approved by DOE but not by NRC. A revision incorporating NRC and State of Nevada comments was submitted to the YMPO on 17 October 1991. We are awaiting a response from YMPO.

Diffusion Test in the Exploratory Studies Facility, R0 (8.3.1.2.2.5). This study plan was approved by the YMPO and DOE/HQ in May 1992 and submitted to NRC for review.

Testing of the C-Hole Sites With Reactive Tracers, R1 (8.3.1.2.3.1.7). In February 1990 DOE/HQ issued this study plan as a controlled document; it was then sent to the NRC for comments. In January 1992 we were requested by DOE to revise NRC comments. The revision was completed in July 1992.

Groundwater Chemistry Modeling, R0 (8.3.1.3.1.1). In March 1991 this study plan was submitted to the project office for review. Comments were returned 31 May 1992 and are now being addressed.

Mineralogy, Petrology, and Chemistry of Transport Pathways, R3 (8.3.1.3.2.1). In August 1990 the NRC approved the study plan. In October 1991 we were asked to revise the study plan; in January 1992 we submitted revised comments to T. Bjerstedt. YMPO returned study plan in August 1992 for final word processing revisions.

History of Mineralogy and Geochemical Alteration at Yucca Mountain, R0 (8.3.1.3.2.2). The Project Office approved the study plan in December 1991 and submitted it to the NRC in January 1992 for comments.

Natural Analog Hydrothermal System in Tuff (8.3.1.3.3.1). This is an out-year activity.

Kinetics and Thermodynamics of Mineral Evolution and Conceptual Model of Mineral Evolution, R0 (8.3.1.3.3.2; 8.3.1.3.3.3). A comment resolution meeting for DOE/HQ and Project Office comments was held in March 1990; revision on this activity has been deferred because funds have not been allocated.

Sorption Studies and Sorption Modeling, R0 (8.3.1.3.4.1; 8.3.1.3.4.3). A new study plan has been issued for internal review. The review was completed in August and returned to the principal investigator for comment resolution.

Biological Sorption and Transport, R1 (8.3.1.3.4.2). Revisions incorporating DOE/HQ and Project Office comments were submitted in May 1991. Additional revised text were submitted in August 1991.

**Study Plans
(continued)**

Dissolved Species Concentration Limits, and Colloid Formation and Stability, R0 (8.3.1.3.5.1; 8.3.1.3.5.2). In November 1991, the project office submitted comments to Los Alamos to revise; that revision is in progress.

Dynamic Transport Column Experiments, R0 (8.3.1.3.6.1). A comment resolution meeting for DOE/HQ and Project Office comments was held in August 1990; revisions are in progress and are expected to be completed by September 1992.

Diffusion, R0 (8.3.1.3.6.2). A comment resolution meeting for DOE/HQ and Project Office comments was held in August 1990; revisions are in progress and are expected to be completed by September 1992.

Retardation Sensitivity Analysis, R0 (8.3.1.3.7.1). This study was approved by the DOE and sent to the NRC for review in July 1992.

Demonstration of the Applicability of Laboratory Data to Repository Transport Calculations, R0 (8.3.1.3.7.2). This study plan is in preparation.

Gaseous Radionuclide Transport Calculations and Measurements, (8.3.1.3.8.1). Funds have not been allocated.

Probability of Magmatic Disruption of the Repository, R0 (8.3.1.8.1.1). This study plan was approved by the Project Office in September 1990 and by the NRC in October 1991.

Physical Processes of Magmatism and Effects on the Potential Repository, R0 (8.3.1.8.1.2). Study plan is complete and has been issued for internal review. The internal review was completed in August and sent to the principal investigator for comment resolution.

Characterization of Volcanic Features, R0 (8.3.1.8.5.1). Accepted by NRC in September 1990.

WBS 1.2.6**Exploratory Studies Facility****Objective**

These Exploratory Studies Facility (ESF) tasks address the issues and information needs associated with the ES-based characterization of Yucca Mountain to determine the suitability of permanently isolating high-level nuclear waste from biosphere in a geologic repository.

Activities and Accomplishments

Continued gathering information on Tracers, Fluids, and Materials (TFM) and requested waste isolation impact and test interference analysis for TFMs from CRWMS M&O and SNL.

Continued to support M&O efforts to develop a position paper on prototyping.

Prepared briefings for biweekly ESF management meetings, attended biweekly ESF Engineering Development Division (ED&D) meetings, and participated in ESF excavation and ESF testing planning meeting.

Reviewed Title II design, Package 1A.

Planned Activities

Continue to develop definitive design related information for launch-chamber tests.

Continue to support integration meetings such as ESF design, surface-based testing and its interface with ESF testing, TIG, and SMF.

Support ED&D justification for prototype test facility and ESF budget options and strategies. Develop interfaces for testing and the ESF design.

Revise and update the PSAR as required.

Begin identifying Project Integrated Data System (IDS) planning.

Prepare abstract for the upcoming waste management conference.

Finalize abstracts for papers for High-Level Waste Management Conference, 34th Rock Mechanics Symposium in Madison, Wisconsin.

Prepare paper on the Integrated Data System for ESF to be submitted to the for the Second International Symposium on Mine Mechanization and Automation.

Problem Areas

None

Milestone Progress

No milestones for FY91.

Publications

None

WBS 1.2.6.8.4 Integrated Data System

Objective

The integrated data system (IDS) supports the Exploratory Studies Facility (ESF) test program by providing a central facility to automatically measure and control aspects of the ESF tests. The primary purposes of the IDS are to assist the principal investigators (PI's) in acquiring high-quality test data in a uniform, controlled fashion and to transfer those data to the PI's organizations for data management and analysis.

Activities and Accomplishments

This activity has been deferred.

WBS 1.2.9.3 Quality Assurance

Objective The Quality Assurance (QA) Program supports Los Alamos Yucca Mountain Site Characterization Project participants and ensures that their efforts provide data and evidence admissible for the repository-licensing process.

Activities and Accomplishments **Software.** Two Configuration Control Board meetings were held. A status report was distributed, and committees for software reviews were established.
Grading Reports. All Los Alamos grading reports have been approved by the Project Office.

Records/Document Control. Quality Administrative Procedure (QP) QP-02.9, R1, "Personnel Proficiency Evaluations"; QP-02.11, R1, "Personnel Orientation and Detailed Technical Procedures"; detailed technical procedure (DP) DP-15, R3, "Crushed Rock Column Studies"; DP-60, R3, "Preparation of NTS Samples for LANL YMP Solid Core Experiments"; DP-61, R3, "Solid Rock Column Experiment," DP-63, R3, "Preparation of NTS Core Samples for Crushed Rock Experiments"; and DP-610, R0, "Extraction and Analysis of Noble Gases from Solids," were approved and distributed. DPs 26, 27, 64, 74 and 82 were withdrawn.

Training. We are currently evaluating the LaDelfe training data base program. The new orientation program, which was scheduled for presentation at Lawrence Berkeley Laboratory in August, has been postponed because of scheduling conflicts.

Program Development. Twenty QPs were in various stages of revision. The 2001 quality assurance budget was revised according to DOE guidelines; basis of estimates were completed. The YMPO draft Qualified Suppliers List was reviewed.

Audits/Surveys. Responses to corrective action reports CAR-057 and CAR-058 were submitted to YMPO; YMPO staff have accepted the proposed resolution for corrective action report CAR-057. The LANL-AR-92-09 (Stanford University) and LANL-AR-92-10 (Lawrence Berkeley Laboratory) audits were postponed because of scheduling conflicts. The annual management assessment report of the Los Alamos QA program is in TPO review.

Planned Activities Internal audit and survey reports will be completed. QP revisions will continue. A draft organizational procedure will be written and submitted for informal review, and the notebook procedure (QP-03.5) will be submitted for formal review.

The selection of a new software configuration manager will be delayed until budget uncertainties have been resolved. The audit schedule will be revised to accommodate scheduling conflicts.

Problem Areas The selection of a new software configuration manager will be delayed until budget uncertainties have been resolved. The audit schedule will be revised to accommodate scheduling conflicts.

Milestone Progress No milestones for FY91.

Publications

S. L. Bolivar and J. L. Day
The Role of the Los Alamos National Laboratory Quality Assurance Liaison for the Yucca Mountain Site Characterization Project
Conference paper, *Proceedings of the ASQC Energy Division Annual Meeting*
Approved by YMPO.